

Third Five-Year Review Report

For

**Helena Chemical Co. Landfill
SCD058753971**

**City of Fairfax
Allendale County, South Carolina**

September 2014

**United States Environmental Protection Agency
Region 4
Atlanta, Georgia**

Approved by:



**Randall Chaffins
Acting Director, Superfund Division**

Date:

9/16/14



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LIST OF ACRONYMS

AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
BHC	Benzene Hexachloride
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminants of Concern
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
EPA	United States Environmental Protection Agency
EPN	Ethyl p-nitrophenyl thionobenzene phosphonate
ESD	Explanation of Significant Difference
FS	Feasibility Study
FYR	Five-Year Review
gpm	gallons per minute
HCC	Helena Chemical Company
HRS	Hazard Ranking System
IC	Institutional Control
LTTD	Low Temperature Thermal Desorption
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollution Discharge Elimination System
NPDWR	National Primary Drinking Water Regulations
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
POTW	Publicly owned treatment works
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RG	Remedial Goal
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control
TBC	To Be Considered
TBD	To Be Decided
VOC	Volatile Organic Compound
µg/L	microgram per liter

Executive Summary

The Helena Chemical Company (HHC) Landfill Superfund site (the Site) is located in Fairfax, South Carolina. Agricultural pesticides were produced at the Site from the 1960's to 1979. A 4-acre area on the northeast portion of the Site was utilized as a former landfill. The former landfill contained pesticide residues and other waste materials generated on-site. The United States Environmental Protection Agency (EPA) placed the Site on the Superfund program's National Priorities List (NPL) in 1990. In 1993, the EPA issued a Record of Decision (ROD), selecting a remedy for the Site. The ROD was amended in 1995 and again in 1998.

The selected remedy for the HCC Landfill site in Fairfax, South Carolina included excavation of contaminated soils and sediments on-site, institutional controls (IC), and extraction of contaminated groundwater by means of a single recovery well. The Remedial Action Objectives (RAOs) for this remedy were to control risks posed by direct contact to contaminated media including; soil, sediment and groundwater, and to minimize migration of contaminants in groundwater.

The remedial action addressed on-site soil contamination, the principal threat at the Site; as well as on-site and off-site groundwater contamination. The major components of the selected remedy included the following:

Source Control

Excavation of contaminated surface and subsurface soil to 3 feet, with verification sampling; Site re-grading to prevent uncontrolled storm-water runoff into waters of the State or the United States.

Groundwater

Extraction of contaminated groundwater from the surface (shallow) aquifer; Treatment and discharge of the treated groundwater to a local Publicly-Owned Treatment Works (POTW) facility.

Mitigation for Adverse Impacts to Wetlands

Mitigation for adverse impacts to environmental receptors in accordance with regulatory guidelines established under the authority of Section 404 of the Clean Water Act.

Site Monitoring

Quarterly sampling of groundwater and nearby public water supply to monitor the concentrations and movement of contaminants in affected and potentially affected aquifers. The goal of the selected remedial action was to restore the impacted groundwater to levels below that of applicable Maximum Contaminant Levels (MCLs), i.e., drinking water standards. The Site achieved construction completion with the signing of the Preliminary Closeout Report on September 13, 1999.

Technical Assessment

Both the shallow and deep groundwater plumes appear to have migrated beyond perimeter wells located on-site and the groundwater plume is undefined. The migration of groundwater and increasing contaminant concentrations in groundwater wells at the Site indicate the remedy is not performing as intended. Increasing sediment contaminant concentration data also indicates potential source material may remain onsite, and could potentially be contributing to the increasing Contaminants of Concern (COC) concentrations in the shallow aquifer. Additionally, the extent of the pesticide contamination in soils has increased in the wetland. It was assumed that contamination measured in the surface water and sediments in the RI would diminish once the remedy was implemented. The increasing contamination in the wetland represents a new exposure pathway. Additionally, the migration of contamination offsite in surface water, or leaching of contamination to groundwater should be considered as new or expanding exposure pathways.

During this Five-Year Review, institutional controls were also evaluated. On May 23, 2014 Helena Chemical Company submitted a copy of a Notice of Hazardous Waste that has been placed on parcel 124-00-00-013. Additional review by EPA determined that a restrictive covenant should be placed on parcel 124-00-00-014, 124-00-00-024 and any properties that have been impacted by the migration of contaminated groundwater.

During the FYR local authorities and nearby residents were interviewed. The vapor intrusion pathway was evaluated during the previous FYR. During the evaluation, it was determined the pathway was incomplete, and despite the presence of Volatile Organic Compounds (VOCs) present in groundwater at elevated concentrations, the current levels of VOCs in groundwater at the site do not exceed EPA risk targets for potential indoor air risk for both a commercial/industrial and the residential use scenario. However, vapor intrusion data should be verified with soil gas data if residential development is considered for the Site.

At this time, the remedy at the HCC Landfill is not protective of human health and the environment because of the increasing soil contaminant concentrations. Additionally, the migration of contamination offsite in surface water or leaching of contamination to groundwater should be considered as new or expanding exposure pathways. Contaminated groundwater migration is not under control and institutional controls (ICs) have not been implemented.

Contaminated sediment and surface water in the wetland area should be delineated and remediated. Additional monitoring wells need to be installed to determine the extent of groundwater contamination and additional recovery wells may need to be installed to fully capture the contaminated groundwater plume. Institutional Controls governing groundwater should be implemented on the Site property as well as on any adjacent properties onto which the contaminated groundwater plume has migrated.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): HCC LANDFILL		
EPA ID (from WasteLAN): SCD058753971		
Region: 4	State: South Carolina	City/County: Fairfax/Allendale
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Construction completion date: 09/13/1999
Has Site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Timothy Kadar		
Author title: Environmental Health Manager		Author affiliation: SCDHEC
Review period**: 03/18/2014 – 06/06/2014		
Date(s) of site inspection: 03/25/2014		
Type of review:		
<input checked="" type="checkbox"/> Post-SARA** <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action-site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action:		
<input type="checkbox"/> Actual RA*** On-site Construction at OU# <input type="checkbox"/> Actual RA Start at OU# 1 <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 09/17/2009		
Due date (five years after triggering action date): 09/17/2014		

**[SARA refers to Superfund Amendments and Reauthorization Act]

***[RA refers to Remedial Action]

[Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form (continued)

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
None				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): OU1	Issue Category: Monitoring			
	Issue: Extent of groundwater plume not adequately delineated.			
	Recommendation: Install additional groundwater wells to adequately define the extent of the contaminated groundwater.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	06/01/2015
OU(s): OU1	Issue Category: Remedy Performance			
	Issue: The current groundwater recovery system is not fully capturing the contaminated groundwater plume.			
	Recommendation: Additional recovery wells need to be installed or the current groundwater recovery system needs to be improved to fully capture the contaminated groundwater plume.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	06/01/2015
OU(s): OU1	Issue Category: Institutional Controls			
	Issue: There are no institutional controls in place to prevent access to contaminated ground water.			
	Recommendation: Institutional controls should be implemented on parcel 124-00-00-014 and all other parcels affected by the migration of contaminated groundwater.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	06/01/2015

Five-Year Review Summary Form (continued)

OU(s): OU1	Issue Category: Monitoring			
	Issue: Chromium speciation in groundwater needs to be performed to determine the percent of Cr+6.			
	Recommendation: Chromium speciation should be performed on 20% of the samples to provide information that can be used to determine the potential percentages of Cr+6 in the total chromium results.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	06/01/2015

OU(s): OU1	Issue Category: Changed Site Conditions			
	Issue: Ecological risk assessment data needs to be updated.			
	Recommendation: Additional risk assessment work should be conducted to incorporate the wider set of receptors including aquatic-dependent wildlife and carnivorous wildlife, as was originally proposed. The contamination in the wetland has increased in magnitude and extent. The current ecological risks at the site exceed the degree of risks understood at the time the wetland mitigation remedy was selected. The increasing concentrations of pesticides in the wetland represent a new exposure pathway. Recommended inclusion of an assessment endpoint to protect the soil invertebrate community.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
Yes	Yes	PRP	EPA/State	06/01/2015

OU(s): OU1	Issue Category: Changed Site Conditions			
	Issue: Toxicity data needs to be updated.			
	Recommendation: The cleanup goal for wetland soils should be revised to create separate goals for individual pesticides using updated toxicity values and exposure assumptions.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
Yes	Yes	PRP	EPA/State	06/01/2015

Environmental Indicators

- Current human exposures at the Site are not under control.
- Current ground water migration is not under control.

Are Necessary Institutional Controls in Place?

☐ All ☒ Some ☐ None

Additional institutional controls need to be implemented

Has EPA Designated the Site as Sitewide Ready for Anticipated Use?

☐ Yes ☒ No

Has the Site Been Put into Reuse?

☐ Yes ☒ No

Sitewide Protectiveness Statement

Protectiveness Determination:
Not Protective

Addendum Due Date (if applicable):
N/A

Protectiveness Statement:

At this time, the remedy at the HCC Landfill is not protective of human health and the environment because of the increasing soil contaminant concentrations. Additionally, the migration of contamination offsite in surface water or leaching of contamination to groundwater should be considered as new or expanding exposure pathways. Contaminated groundwater migration is not under control and institutional controls (ICs) have not been implemented. Contaminated sediment and surface water in the wetland area should be delineated and remediated. Additional monitoring wells need to be installed to determine the extent of groundwater contamination and additional recovery wells may need to be installed to fully capture the contaminated groundwater plume. Institutional Controls governing groundwater should be implemented on the Site property as well as on any adjacent properties onto which the contaminated groundwater plume has migrated.

1.0 Introduction

The purpose of a FYR is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. FYR reports document FYR methods, findings and conclusions. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The EPA prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The EPA interpreted this requirement further in the NCP. The Code of Federal Regulations (CFR) states, in 40 CFR §300.430(f)(4)(ii):

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The South Carolina Department of Health and Environmental Control (SCDHEC) conducted the FYR and prepared this report regarding the remedy implemented at the Helena Chemical Company Landfill Superfund site in Fairfax, Allendale County, South Carolina. The SCDHEC

personnel conducted this review from March 2014 to June 2014. The EPA is the lead agency for developing and implementing the remedy for the potentially responsible party (PRP)-financed cleanup at the Site.

This is the third FYR for the Site. The triggering action for this review is the signature date of the second FYR. The FYR is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. This FYR Report addresses the entire Site.

2.0 Site Chronology

Table 1 lists the dates of important events for the Site.

Table 1: Chronology of Site Events

Date	Event
prior to the mid-1960's	Agricultural Pesticide Production by Atlas Chemical Company
mid-1960's - 1971	Agricultural Pesticide Production by Blue Chemical Company
1971-1978	Agricultural Pesticide Production by HCC
1979	Pesticide Production ceased; retail location created by HCC
November 1980	Site Initially Investigated by South Carolina Department of Health and Environmental Control SCDHEC
December 1980	Initial Soil Samples collected from SCDHEC
July 1981	Site Discovery - SCDHEC issued NOV for waste disposal operation
October 1, 1981	Administrative Order of Consent for RI/FS
October 1981 - July 1982	Preliminary Assessment / Site Inspection Activities
September 14, 1982	Identification and Preliminary Assessment Report
March 29, 1985	Preliminary Site Inspection Report
August 8, 1985	Site Inspection Report
June 1987	Hazardous Ranking Score Complete
June 24, 1988	Proposal to NPL
March 31, 1989	RI/FS Negotiations
April 12, 1989	Administrative Order of Consent
February 21, 1990	Final Listing on NPL
December 31, 1992	Final Remedial Investigation Report
January 13, 1993	Feasibility Study
September 8, 1993	Record of Decision
September 22, 1993	Administrative records
May 25, 1994	RD/RA Negotiations
June 14, 1994	Unilateral Administrative Order
September 1, 1995	ROD Amendment (First Amendment)
April 30, 1997	Final Design Report
May 28, 1997	PRP RD
February 11, 1999	ROD Amendment (Second Amendment)
September 13, 1999	Preliminary Close-out Report
December 19, 2002	2002 Groundwater and Sediment Monitoring Report
March 1, 2004	2003 Groundwater and Sediment Monitoring Report
September 17, 2004	First Five-Year Review Report
March 1, 2005	2004 Groundwater and Sediment Monitoring Report

Date	Event
March 1, 2006	2005 Groundwater and Sediment Monitoring Report
April 3, 2007	2006 Groundwater and Sediment Monitoring Report
March 14, 2008	2007 Groundwater and Sediment Monitoring Report
March 12, 2009	2008 Groundwater and Sediment Monitoring Report
September 17, 2009	Second Five-Year Review Report
February 23, 2010	Field Sampling Plan and Quality Assurance Project Plan
May 28, 2010	2009 Groundwater and Sediment Monitoring Report
June 15, 2010	Second Five Year Review: Work Plan in Response to EPA Recommendations to Address Current Issues at the Helena Chemical Company Landfill Site
March 24, 2011	2010 Groundwater and Sediment Monitoring Report
April 19, 2012	2011 Groundwater and Sediment Monitoring Report
July 23, 2012	Second Five Year Review: Work Plan in Response to EPA Recommendations to Address Current Issues at the Helena Chemical Company Landfill Site, Revision 01
August 24, 2012	Permit Request for Shallow and Deep Well Installation
April 17, 2013	2012 Supplemental Activities & Annual Monitoring Report

3.0 Background

3.1 Physical Characteristics

The Site, in Fairfax, South Carolina is located on 13.5 acres adjacent to Highway 321 in Allendale County, South Carolina (Figure 1). Located at the facility is a former landfill, which contains pesticide residues and other waste materials generated on-Site.

The former landfill occupies approximately four (4) acres on the northeast portion of the Site. A chain link security fence topped with barbed wire encircles the Site. A municipal water supply well that is utilized by a population of approximately 2,300 is located 200 feet west of the property. Three buildings exist on the Fairfax property, two warehouses and an office building (Figure 2).

The north warehouse, which was once utilized to house the liquid insecticide formulation operation, is currently used to store various pesticides, herbicides, and fertilizers, which are sold to farmers. There are several significant features of the liquid formulation building which were focal points of the investigation. Two 22,000 gallon above ground solvent tanks were once located near the north entrance to the "kettle room" in the former liquid formulation building. These tanks were present prior to Helena's occupancy of the property. Solvents used in the formulation process were delivered to the Site by rail car via a rail spur, which borders the Site to the east. The solvents were offloaded by pressurizing the tanker cars and pumping the solvents through product lines, which ran under the formulation building to the storage tanks. The solvent tanks are no longer present; however, the concrete slab on which the tank saddles rested still exists.

An additional warehouse formerly located at the Site, where powdered insecticides were formulated, has been demolished and disposed. A septic tank system that serviced the Site is located between the north liquid formulation building and the office.

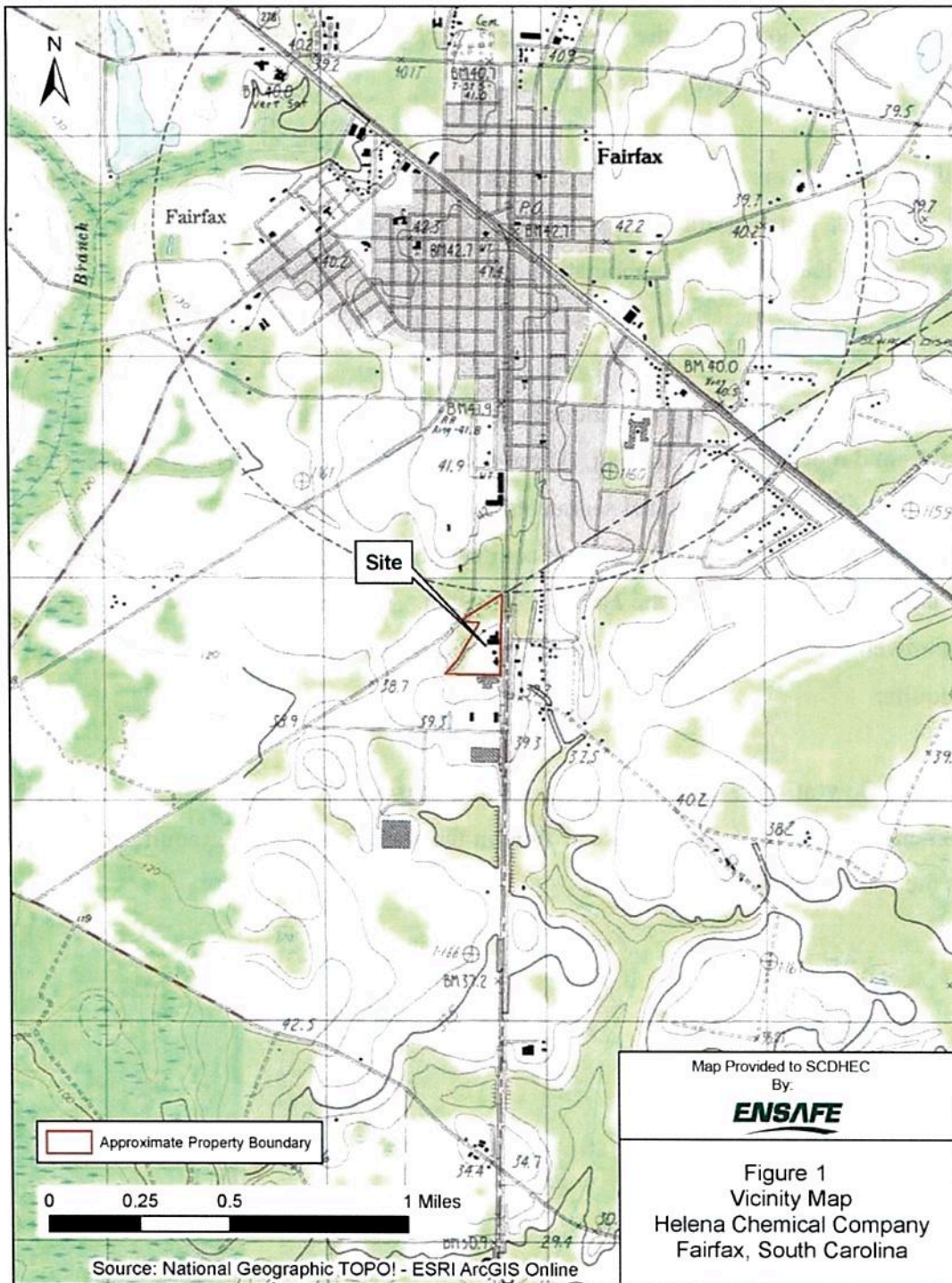
The local topography of the Fairfax area exhibits little relief (Figure 2). The Site property slopes slightly to the north. North of the property is a topographically low area that collects

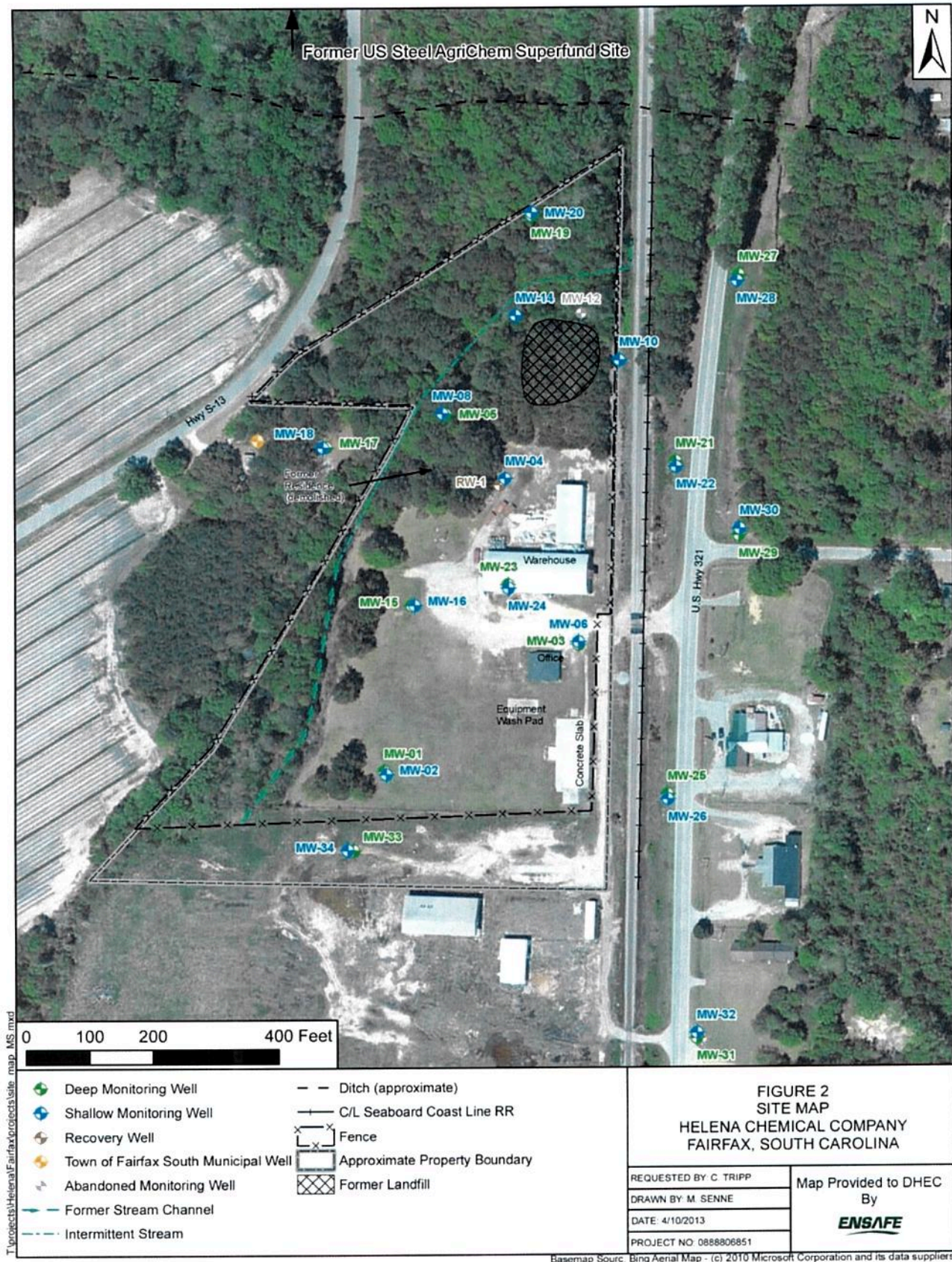
surface water during period of high rainfall. Additionally, surface water from the facility drains into a small ditch that parallels the property to the northwest. This ditch carries the water to Duck Creek, a tributary located northwest of the property, which in turn flows into the Coosawatchie River located to the west of the Fairfax property. The creek and the river are located within a three (3) mile radius of the Site.

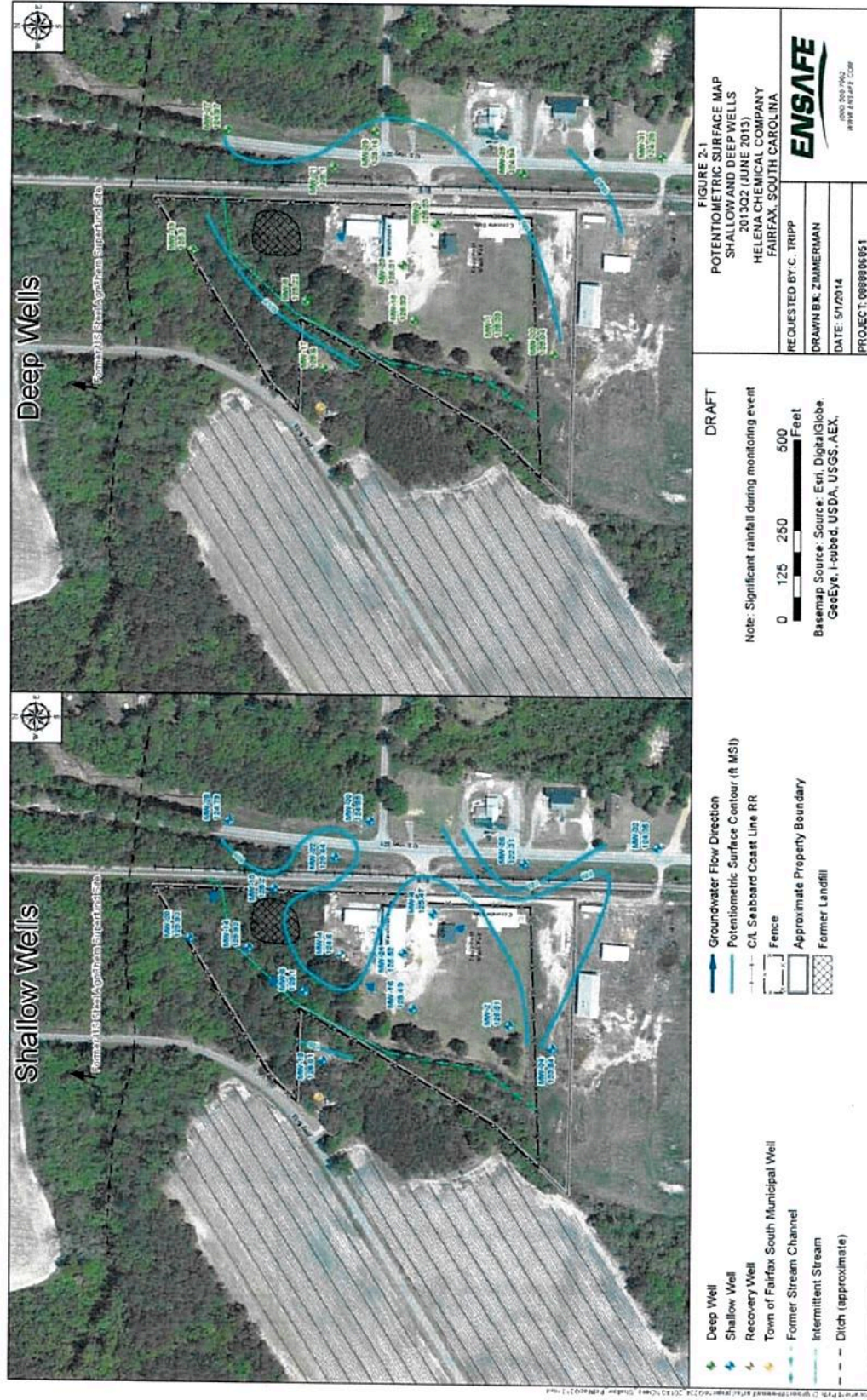
The facility property is bordered to the south by an abandoned manufacturing company, Corbett Plywood; to the north by heavily wooded undeveloped property, railroad tracks and U.S. Hwy 321 to the east, and a combination of cultivated and partially wooded property to the west.

Site-specific geological and stratigraphic information was developed during the installation of test borings and monitoring well boring. Three distinct stratigraphic units were observed in the upper 145 feet of the unconsolidated sediments encountered at the Site. Two aquifers occur at the Site. The uppermost aquifer (shallow aquifer) occurs within the sands of the Barnwell Group and the lower portion of the Duplin Formation. The deeper aquifer occurs within the lower Barnwell Group. No distinct confining unit separates the water table aquifer from the deeper aquifer

Groundwater flow at the Site is described as being seasonally variable. However, based on potentiometric data collected groundwater flow in the shallow and deeper aquifer is generally towards the southeast (Figure 2-1).







3.2 Land and Resource Use

Several companies have owned and operated pesticide formulation facilities at the Site currently owned by HCC. Prior to the mid-1960s, the Site was owned by Atlas Chemical Company then from the mid-1960s until 1971 it was owned by Blue Chemical Company. Between the years 1971-1978, HCC used the Site for the formulation of both liquid and dry agricultural insecticides. HCC ceased formulation operations at the Site in 1979 and currently operates a retail facility that sells fertilizers, herbicides, pesticides and seed.

Drinking water at the Site and surrounding residential properties is provided by the City of Fairfax.

3.3 History of Contamination

As described above, several companies have owned and operated pesticide formulation facilities at the Site, currently owned and occupied by HCC. Chemicals that have been stored and/or formulated at the facility during its active life include dichlorodiphenyltrichloroethane (DDT), aldrin, toxaphene, disulfoton, dieldrin, chlordane, benzene hexachloride (BHC), ethoprop, methyl parathion and ethyl p-nitrophenyl thionobenzene-phosphonate (EPN). During the formulation process, these chemicals were mixed with carrying agents including diesel fuel, volatile organic chemicals and adsorbent materials.

3.4 Initial Response

The first regulatory actions taken at the Site occurred in November 1980, as a result of reports by a former employee of HCC and a newspaper report that a waste dump was being operated on the Site. The Site was investigated at that time by the SCDHEC. Numerous soil samples were collected and analyzed in December 1980. High levels of various pesticides, including aldrin, BHC isomers, chlordane, dieldrin, disulfoton, endrin and toxaphene were detected in these samples.

The SCDHEC issued a Notice of Violation to HCC in July 1981, for the operation of a waste disposal facility in violation of applicable South Carolina regulations. Administrative Order of Consent (AOC) No. 81-05-SW was issued on October 1, 1981.

In compliance with the terms of this Consent Order, HCC conducted investigations at the Site lasting from October 1981, to July 1982. The results of these studies indicated that surficial soils were heavily contaminated with pesticides, including those identified in the earlier sampling described above. Groundwater sampling for this investigation was contradictory. The positive results reported from the first sampling event were not confirmed. Surface water samples, taken from water standing in the wetland areas in the northern portion of the Site were found to be heavily contaminated with site-related pesticides.

HCC prepared a plan for site remediation which was submitted to the SCDHEC for review, and, under the terms of an amendment to Administrative Consent Order No. 81-05-SW, dated March 12, 1984, remediation efforts were conducted that consisted mainly of the removal of approximately 500 cubic yards of contaminated soils to a permitted hazardous waste landfill. In 1985, the EPA, in conjunction with the SCDHEC, conducted a Site Screening Investigation at the Site in order to prepare a Hazard Ranking System (HRS) package to determine whether the Site should be included on the National Priorities List (NPL). The HRS package was completed in June 1987, and the Site was proposed for listing in June 1988. The Site was finalized on the NPL in February 1990.

3.5 Basis for Taking Action

In April 1989, the EPA entered into an AOC with HCC to perform a remedial investigation. HCC completed the investigation in December 1992. Investigation results indicated that soil, surface water, and groundwater contaminant concentrations presented unacceptable risk to human health and the environment. The pathways included:

- Current and future dermal exposure and ingestion to on-site contaminated surface soils
- Current and future direct contact with surface water
- Future ingestion of contaminated groundwater

4.0 Remedial Actions

In accordance with CERCLA and the NCP, the overriding goals for any remedial action are protection of human health and the environment and compliance with Applicable or Relevant and Appropriate Requirements (ARARs). A number of remedial alternatives were considered for the Site, and final selection was made based on an evaluation of each alternative against nine evaluation criteria that are specified in Section 300.430(f)(5)(i) of the NCP. The nine criteria include:

1. Overall Protectiveness of Human Health and the Environment
2. Compliance with ARARs
3. Long-Term Effectiveness and Permanence
4. Reduction of Toxicity, Mobility or Volume of Contaminants through Treatment
5. Short-term Effectiveness
6. Implementability
7. Cost
8. State Acceptance
9. Community Acceptance

4.1 Remedy Selection

The EPA selected the remedy for the Site in the September 1993 Record of Decision (ROD). The ROD listed the following RAOs:

- The remedial action objective for contaminated groundwater is to restore the affected aquifer to a condition that renders it suitable for use as a potable water supply.
- The overall remedial action objective for the surface and subsurface soils is to remove and remediate contaminated soils to such a degree that both groundwater quality (in conjunction with ground-water extraction and treatment) and human health are protected.

- The remedial action objective for the fill and the contaminated sediments is to mitigate for the impacts that have resulted in these unacceptable levels of risk to environmental receptors.

The selected remedy, as stated in the ROD, included several major components and a contingency remedy:

Source Control

Excavation of contaminated surface and subsurface soil, with verification sampling; treatment of the contaminated soils by means of hydrolytic/photolytic dechlorination and biological degradation; placement of the treated soils into on-site excavations.¹

Site re-grading to prevent uncontrolled storm-water runoff into waters of the State or the United States.

Groundwater

Extraction of contaminated groundwater from the surface (shallow) aquifer and treatment and discharge of the treated groundwater to a local Publicly Owned Treatment Works (POTW).

Mitigation for adverse impacts to wetlands

Mitigation for adverse impacts in the wetlands to environmental receptors in accordance with regulatory guidelines established under the authority of Section 404 of the Clean Water Act.

Site Monitoring

Annual sampling of groundwater and nearby public water supply to monitor the concentrations and movement of contaminants in affected and potentially affected aquifers.

¹ Subsequent ROD amendments changed this treatment option.

Contingency Remedy

Low temperature thermal desorption (LTTD) is a contingency remedy for soil treatment, to be implemented should the chosen soil treatment technology prove incapable of achieving performance standards.

The 1993 ROD was amended in 1995 and again in 1999. Both amendments addressed the selected treatment technology and remedial alternative for the treatment of contaminated soils at the Site. The September 1, 1995 ROD amendment changed the treatment technology for contaminated soils from on-site hydrolytic/photolytic dechlorination, and bioremediation, to off-site incineration at a Resource Conservation and Recovery Act (RCRA)-permitted incinerator located in Clive, Utah. All other requirements of the September 1993, ROD remained unaffected.

The February 11, 1999 ROD amendment also addressed the treatment of contaminated soils at the Site. The modification of the remedy for contaminated soils included the excavation of approximately 6,500 cubic yards of pesticide contaminated waste and segregation of the waste into three categories consisting of demolition debris, soils with low and high contamination concentrations.

Soils with high concentrations of contaminants would be sent to the Sarnia hazardous waste landfill, regulated by the Ontario Ministry of Environment and Energy in Canada. Pre-excavation sampling indicated that 34 of the 46 waste samples exhibited contamination below the cutoff level for Sarnia. Helena then petitioned EPA to amend the 1995 ROD Amendment to allow for portions of the site waste to be sent to Sarnia, thereby reducing the overall remedy costs estimates from \$3,517,000 (incineration only) to \$2,361,900 (combination of incineration and landfill). All demolition debris would be sent to a RCRA regulated Subtitle C landfill.

The ROD required a remediation goal of 5 ppm of total pesticides for soils and sediments. The ROD selected cleanup goals for soils and sediments based on the potential for direct contact with and/or ingestion of the contaminated soil above health-

based levels and to eliminate soil as a potential source of groundwater contamination. The ROD identified sixteen contaminants of concern for the Site's groundwater (Table 2). The ROD based groundwater cleanup goals on the EPA National Primary Drinking Water Regulations (NPDWRs) Maximum Contaminant Levels (MCLs) for direct contact or ingestion.

Table 2: Groundwater Remedial Goals

Groundwater Remedial Goals	
Contaminant of Concern	ROD Established Remedial Goal (µg/l)*
<i>Volatile Organic Compound</i>	
Benzene	5
<i>Inorganics</i>	
Chromium	100
Lead	15
<i>Pesticides</i>	
4,4'-DDT	0.1
4,4'-DDD**	0.1
4,4'-DDE***	0.1
Aldrin	0.002
Alpha-BHC	0.006
Beta-BHC	0.02
Chlordane	2
Delta-BHC	0.006
Dieldrin	0.002
Endrin	2
Gamma-BHC (Lindane)	0.2
Heptachlor	0.4
Toxaphene	3

*µg/L refers to micrograms per liter

*DDD refers to Dichlorodiphenyldichloroethane

**DDE refers to Dichlorodiphenyldichloroethylene

4.2 Remedy Implementation

In June 1994, EPA issued a Unilateral Administrative Order to HCC, which required HCC to conduct the Remedial Design and Remedial Actions prescribed by the ROD.

Soil/Sediment Remedy

Since 1983, soil and part of the landfill has been removed from the Site during four separate actions. The March 1984 and April 1992 removals are discussed in Section 3.4, Initial Response.

The Remedial Design for the Soil/Sediment remedy began in 1995 and was completed in 1997 by the PRP with EPA oversight.

In the summer of 1995, approximately 700 cubic yards of soil were excavated from the Site and incinerated. Except for soil in and around the landfill, all soils exceeding the removal standard of 50 milligrams per kilogram (mg/kg) total pesticides as specified in the ROD, was excavated and shipped to Laidlaw Environmental Services' incinerator facility in Clive, Utah.

Excavation of the landfill occurred during the time frame of September to October 1998. The soil removal and off-site disposal occurred in conformance with the 1999 ROD amendment. Confirmation samples were collected prior to backfilling the excavation, to determine if the remediation goal of 50 mg/kg total pesticide concentrations had been attained. The confirmation sample concentrations ranged from 3.3 mg/kg to 42.7 mg/kg with an average of 12.1 mg/kg.

Remedial Action activities in the wetland area were conducted from September 14-16, 1998. The area north of the landfill was heavily vegetated. After the vegetation was cleared, the soil berm located in the wetland was easily distinguished from the surrounding wetland because it was approximately 75 feet long by 15 feet wide and up to 6 feet high. To disturb as little of the wetland as possible, the entire berm and 1 foot of material below it was removed. The concrete pad next to the north warehouse was first

covered with plastic sheeting so the material removed from the wetland could be stockpiled on top of it. A track hoe excavator was then used to excavate the soil berm and frontend loaders transported it from the north edge of the landfill to the concrete pad next to the north warehouse. The need to move the wetland material across the length of the landfill was the reason why the wetland area was excavated before the landfill.

A second low berm of soil near the northwest corner of the landfill was investigated after the first berm was removed. This berm was approximately 15 feet long by 5 feet wide by 2 feet high. Initial excavation uncovered numerous crushed and rusted metal drums. Continued excavation showed that the berm was attached to the landfill. EnSafe and USEPA discussed the northwest berm and decided to consider it part of the landfill, not the wetland, which changed the RAO for this area. Ultimately, much more soil was removed from the northwest corner of the landfill than the northwest berm of soil, so excavation of this berm is dealt with as if it was another part of the landfill. See Section 3 for further discussion of the berm in the landfill's northwest corner.

All wetland and landfill excavation activities were complete by October 1998.

Groundwater Remediation

The Remedial Design for the groundwater remediation system began in 1995 and was completed in 1997 by HCC with EPA oversight. During the April/May 1995 preliminary design investigation, the aquifer was tested to establish the nature of groundwater representative of full-scale extraction, and to obtain best estimates of hydraulic conductivity, transmissivity, and storativity of the shallow aquifer for use in extraction system design. A single recovery well, RW-1, was installed for the test. Various recovery wells scenarios were studied for implementation; however a single recovery well was determined to be sufficient.

The recovery well was determined to recover groundwater at an average rate of 40 gallons per minute (gpm).

The groundwater recovery system consists of one recovery well, RW-1, fitted with an electrical submersible pump. The system began operating in September 1999. No pretreatment of recovered groundwater occurs prior to being pumped and discharged to an on-site sanitary sewer manhole. The discharge requirements are regulated through an Industrial User Discharge Permit with the Town of Allendale. Water flows by gravity to a lift station, which is located approximately 200 feet to the northwest. An electronic control panel regulates the pump, pump cycle, and low-water-level sensor. The recovered groundwater is treated in the Town of Allendale's wastewater treatment plant under the terms of an industrial sewer user permit.

Routine water level measurements are used to record the actual radius of influence from the drawdown at the recovery well during start-up. Groundwater samples are collected and analyzed for contaminants of concern (COCs) annually, to determine remediation system progress. The expected time frame for significant restoration of the groundwater was 9 to 15 years from the time the remedial system began operating.

The Remedial Action was determined to be construction complete with the signing of the Preliminary Close-Out Report on September 13, 1999.

4.3 Operation and Maintenance

Fifteen years of site operation and maintenance (O&M) activities have been completed at the Site. O&M activities at the Site are conducted by EnSafe from Memphis, Tennessee on behalf of HCC. Groundwater and sediment samples are collected annually at the Site. In addition to annual groundwater and sediment monitoring, groundwater discharge samples are collected and analyzed quarterly as required by the Industrial User Discharge Permit.

The 2014 FYR site inspection revealed the need for some minor site maintenance. Damaged sections of the perimeter fence need to be repaired. The perimeter fence within the wooded and wetland areas need to be cleared of ice/wind damaged trees. The southern perimeter fence (running east to west) needs to be moved approximately 130

feet south to the property line. This will place MW-34 within the secured perimeter of the Site. The volunteer growth pines located on the former landfill area should be assessed for any potential impact to the Site.

This summary includes the annual costs for the operation and maintenance of the extraction/recovery well, which includes the drilling subcontractor and labor to remove and replace the pump and maintain the flow meter. Annual costs for the monitoring of groundwater wells, sediment in the wetlands, the municipal drinking water wells, along with all quarterly monitoring events of the recovery well are also included. Costs for the quarterly documentation and reporting requirements to the Town of Allendale under the Industrial User Discharge Permit, and for the annual data validation, documentation, and reporting requirements to the USEPA and SCDHEC are also calculated into the total.

Table 3: Annual Operation and Maintenance Costs (2009-2013)

Year	O & M Costs for Extraction & Recovery Well	Monitoring and Reporting Costs
2009	\$4,700	\$61,200
2010	\$3,500	\$113,000
2011	\$5,050	\$52,200
2012	\$21,710	\$186,290
2013	\$13,550	\$130,500

Significant deviations in the range of costs are detailed below:

2010

Monitoring and reporting costs increased due to the required preparation and production of a new Sampling and Analysis Plan and Quality Assurance Project Plan to address issues identified in the 2009 5-Year Review.

2012

O&M costs increased due to purchase and installation of new pump and flow meter, and additional maintenance required for the flow meter.

Monitoring and reporting costs increased due to the installation and sampling of eight (8) new monitoring wells, and a water use survey conducted to address issues identified in the 2009 FYR.

2013

O&M costs increased due to repair and replacement of the discharge pipe for the recovery well and additional maintenance required for the flow meter.

Monitoring and reporting costs increased due to the monitoring of eight (8) new monitoring wells and additional quarterly monitoring events during 2013.

Table 4 summarizes the O&M costs during the previous five years. O&M costs average approximately \$118,340 per year. O&M costs were estimated during the Feasibility Study for O&M of the groundwater remediation and the on-site landfill area. Current O&M costs at the Site are below cost estimates developed during the Feasibility Study.

5.0 Progress Since the Last Five-Year Review

In September 2009, the second Five-Year Review's protectiveness statement read as follows:

"The remedy at the HCC Landfill protects human health and the environment in the short-term because there are no exposure pathways. According to local authorities and nearby residents interviewed during this Five Year Review, drinking water is obtained from the Town of Fairfax, and no drinking water wells are located nearby. The vapor intrusion pathway was evaluated however a thorough evaluation of specific data indicated that the vapor intrusion pathway is not a complete pathway at this time. The direct exposure soil pathway has been addressed through excavation and removal of contaminated soils.

However, in order for the remedy to be protective in the long-term, the following actions need to be taken. Additional recovery wells need to be installed to fully capture the contaminated groundwater plume. Additional monitoring wells need to be installed to determine the extent of groundwater contamination. Sampling of the nearby Fairfax Municipal well should be continued. Sampling for metals in groundwater at the Site should be continued. The ROD needs to be modified through either an Explanation of Significant Difference (ESD) or ROD Amendment to require Institutional Controls on the Site property as well as on any adjacent properties onto which the contaminated groundwater plume has migrated. The current Restrictive Covenant needs to be modified to correct inaccurate information and to include the entire Site.

The 2009 FYR included eleven issues recommendations. This report summarizes each recommendation and its status below.

Table 4: Progress on Recommendations from 2009 FYR

Issue	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Additional wells should be installed and sampled to define the extent of groundwater contamination.	HCC	03/17/2010	Additional wells were installed	October 2012
Based upon the information collected in response to the above issue; additional recovery wells may need to be installed at the Site or the existing system may need to be upgraded in an effort to capture the migrating groundwater contamination.	HCC	09/17/2010	TBD – Design Conceptual Site Model	In Progress
Considering the extent of groundwater contamination is unknown at this time, a water use survey should be performed within a 1-mile radius of the Site.	HCC	03/17/2010	Water Use Survey Conducted.	2012
The ROD needs to be modified through either an ESD or ROD Amendment to require Institutional Controls.	EPA	09/17/2010	ROD Amendment or ESD.	In Progress
Institutional controls should be reviewed and revised for the Site as necessary.	HCC	09/17/2010	Place a restrictive covenant on the Site property.	In Progress
Any surrounding impacted properties should have ICs in the form of a restrictive covenant placed on the deed to the impacted property.	HCC	09/17/2010	Place restrictive covenants on properties impacted by Site related contaminants.	In Progress
The nearby Fairfax Municipal well should be sampled annually for Site related COCs and analyzed utilizing a low pesticide concentration method.	HCC	2009 Annual Sampling Event	Fairfax Municipal well analyzed annually utilizing CLP low pesticide concentration methods.	Complete/Ongoing
Sampling for metals in groundwater at the Site should resume.	HCC	2009 Annual Sampling Event	Sampling for metals in groundwater has resumed.	Complete/Ongoing
A QAPP* should be developed for the Site.	HCC	11/01/2009	QAPP was completed in 2010.	February 23, 2010
Evaluate increasing contaminant concentrations in sediment.	HCC	2009 Annual Sampling Event	Additional sediment samples collected to delineate the extent of sediment contamination.	In Progress/Ongoing
Update Site Repository information or location.	EPA	03/17/2010	Site Repository re-established and updated.	2012

*"QAPP" refers to Quality Assurance Project Plan

6.0 Five-Year Review Process

6.1 Administrative Components

EPA Region 4 initiated the FYR in March 2014 and scheduled its completion for June 2014. The SCDHEC review team, led by Timothy Kadar, also included the Remedial Project Manager Kayse Jarman, Environmental Health Manager Robert Cole, and the Community Liaison Donna Moye. The review schedule established consisted of the following activities:

- Community Notification
- Site Inspection (EPA, HCC and SCDHEC)
- Community Interviews
- Document Review
- Data Review
- FYR Report Development and Review

6.2 Community Involvement

In March 2014, the SCDHEC placed a public notice in the *Allendale Sun* newspaper announcing the commencement of the FYR process for the Site. The notice requested community participation in the FYR process and provided contact information for RPM Candice Teichert and Community Liaison Donna Moye. The press notice is available in Appendix B. No contact was made to EPA as a result of the advertisement.

The FYR report will be made available to the public once it has been issued. Copies of this document will be placed in the designated public repository: Fairfax City Hall, 635 Allendale Fairfax Highway, Fairfax, South Carolina.

On March 25, 2014, the SCDHEC Community Liaison Donna Moye and SCDHEC RPM Charles Williams interviewed several residents that live near the Site. A summary of the interviews are provided in Section 6.6.

6.3 Document Review

This FYR included a review of relevant, site-related documents including the ROD, remedial action reports, and recent monitoring data. Appendix A includes a complete list of the documents reviewed.

ARARs Review

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain “a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment.” The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that specifically address a hazardous substance, remedial action, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements are those standards that, while not “applicable,” address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are more stringent than federal requirements may be applicable or relevant and appropriate. To-Be-Considered criteria are non-promulgated advisories and guidance that are not legally binding, but should be considered in determining the necessary remedial action. For example, To-Be-Considered criteria may be particularly useful in determining health-based levels where no ARARs exist or in developing the appropriate method for conducting a remedial action.

Chemical-specific ARARs are health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish an acceptable amount or concentration of a chemical that may remain in, or discharged to, the ambient environment. Examples of chemical-specific ARARs include maximum contaminant levels (MCLs) under the federal Safe Drinking Water Act and ambient water quality criteria enumerated under the federal Clean Water Act.

Action-specific ARARs are technology- or activity-based requirements or limits on actions taken with respect to a particular hazardous substance. These requirements are triggered by a particular remedial activity, such as discharge of contaminated ground water or in-situ remediation.

Location-specific ARARs are restrictions on hazardous substances or the conduct of the response activities solely based on their location in a special geographic area. Examples include restrictions on activities in wetlands, sensitive habitats and historic places.

Remedial actions are required to comply with the chemical-specific ARARs identified in the ROD. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

Ground Water ARARs

According to the Site's 1993 ROD, the ground water ARARs are the National Primary Drinking Water Standards (40 CFR Part 141). The ROD also identified South Carolina chemical-specific ground water ARARs for the Site. However, the State of South Carolina adopted the federal drinking water standards in their entirety. As shown in Table 5, drinking water standards have not changed.

Table 5: Summary of Groundwater ARAR Changes

Contaminants of Concern	1993 ROD ARARs (µg/L)	Current ARARs (µg/L)	ARAR Change
Aldrin	0.002	0.002	No
Alpha-BHC	0.006	0.006	No
Beta-BHC	0.02	0.02	No
Dieldrin	0.002	0.002	No
DDE	0.1	0.1	No
South Carolina Drinking Water MCLs are found at http://www.scdhec.gov/environment/water/regs/r61-58.pdf To be considered Cleanup Goal Federal Maximum Contaminant Level Secondary Drinking Water Standards			

Soil and Sediment ARARs

Changes in toxicity and other contaminant characteristics were evaluated for soil and sediment data for this FYR. Both carcinogenic and non-carcinogenic values were re-evaluated based on the new or revised toxicity values and they are still within EPA's acceptable risk range.

Table 6: Summary of Soil and Sediment ARAR Changes

Contaminant	CAS Number	1993 ROD values		2014 5 Year Review values		Date Last Revised	Has the Value Changed Since the 1993 ROD?
		Slope Factor (SF) (mg/kg/day) ⁻¹	ROD (mg/kg/day)	2014 Slope Factor (SF) (mg/kg/day) ⁻¹	2014 ROD (mg/kg/day)		
Chlordane	12789-03-6	1.3	0.00006	0.35	0.0005	2/7/1998	Yes
Endrin	72-20-8	NA	0.0003	NA	0.0003	4/1/1991	No
Heptachlor	76-44-8	4.5	0.0005	4.5	0.0005	3/1/1991	No
Heptachlor Epoxide	1024-57-3	9.1	0.000013	9.1	0.000013	3/1/1991	No
Disulfoton	298-04-4	NA	0.00004	NA	0.00004	3/1/1988	No
Benzene	71-43-2	0.029	NA	.015-.055	0.004	4/17/2003	Yes
Aldrin	309-00-2	17	0.00003	0.00003	17	3/1/1988	No
α-BHC (α-HCH)	319-84-6	6.3	NA	6.3	NA	No Data	No
β-BHC (β-HCH)	319-85-7	1.8	NA	1.8	NA	No Data	No
gamma-BHC (Lindane)	58-89-9	1.3	0.0003	NA	0.0003	3/1/1988	No
delta-BHC (delta-HCH)	319-86-8	NA	NA	NA	NA	No Data	No
Dieldrin	60-57-1	16	0.00005	16	0.00005	9/1/1990	No
Endosulfan	115-29-7	NA	0.00005	NA	0.006	10/1/1994	Yes
DDD	72-54-8	0.24	NA	0.24	NA	No Data	No
DDE	72-55-9	0.34	NA	0.34	NA	No Data	No
DDT	50-29-3	0.34	0.0005	0.34	0.0005	2/1/1996	No
Toxaphene	8001-35-2	1.1	NA	1.1	NA	No Data	No
TBPT		NA	NA	NA	NA	No Data	No
Methoxychlor	72-43-5	NA	0.005	NA	0.005	8/1/1991	No
Chlorobenzilate	510-15-6	NA	0.02	NA	0.02	12/1/1989	No
Chromium [Chromium (III)]	16065-83-1	NA	1	NA	1.5	9/3/1998	Yes
Lead	7439-92-1	NA	0.0014	NA	NA	7/8/2004	Yes

Institutional Control Review

In March 2014, DHEC staff visited the Allendale County Public Records Office and found no recorded institutional controls for Site properties. On April 30, 2014, HCC recorded a Notice of Hazardous Waste on the 3.5 acre parcel (parcel 124-00-00-013) that contained the former landfill. Allendale County identifies the following parcels within the Site property boundary: 124-00-00-013, 124-00-00-014, 124-00-00-024 (Figure 3).

The 1993 ROD, and both the 1995 and 1999 Amendments to the ROD did not require institutional controls. Ground water contamination remains on-site and has migrated off-site; therefore, ground water use restrictions should be implemented on any impacted properties.

Table 7: IC Summary Table

Area of Interest – OU1 Groundwater at Helena Chemical Co. (Parcels: 124-00-00-013, 124-00-00-014, and 124-00-00-024)						
Media	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Instrument in Place	Notes
Ground Water	Yes	No	Site and unknown surrounding parcels	Restrict installation of groundwater wells.	Notice of Hazardous Waste placed on deed for Parcel 124-00-00-013	Parcel 124-00-00-014, 124-00-00-024, and unknown surrounding parcels still need ICs



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

6.4 Data Review

Per the ROD, groundwater is monitored annually in 12 shallow wells that are screened between 15 and 25 feet below ground surface (bgs) and in nine deep wells that are screened between 90 and 100 feet bgs. In 2012, four shallow and four deep supplemental wells were installed and incorporated into the monitoring system. The objectives of the monitoring system are to monitor mass contaminate removal and to evaluate plume degradation over time in the shallow aquifer and to monitor contaminant trends and evaluate plume degradation over time in the deep aquifer. Groundwater remediation standards are listed in Table 2 and documented in the 1993 ROD. Groundwater shall be extracted until the remediation goals are obtained.

All groundwater samples that are collected from both the shallow and deep aquifers are analyzed for the COCs identified in Table 5. Groundwater samples that are collected from monitoring wells MW-3, MW-4 and MW-23 are additionally analyzed for volatile organic compounds (VOCs).

Extracted groundwater is discharged directly to the POTW, per an Industrial User Permit with the town of Allendale in accordance with the town's Sewer Use Ordinance and Pretreatment Regulations. Samples are collected quarterly and analyzed for a specified list of parameters, to verify that appropriate limits are achieved.

In addition to monitoring groundwater, pesticide concentrations in sediment within the wetland area are monitored in accordance with the Remedial Action Work Plan. Samples are collected annually from 10 locations. A five-point composite sample is collected from each grid and submitted for analysis (Figure 4). The objectives of the sampling include verifying compliance with the established remediation goal (RG) of 5 mg/kg total pesticide concentration cleanup criterion, monitoring natural degradation of pesticides and potential deposition of contaminated sediments within the wetland.

This section of the report includes an evaluation of current ground water conditions and considers potential options for enhancement of the ground water remedial action. The data are systematically evaluated as follows:

- Sediment data
- Shallow aquifer data from monitoring wells
- Deep aquifer data from monitoring wells
- Overall recovery well system evaluation

Sediment

Five-point composite samples are collected annually from each grid as shown on Figure 4. The objectives of the sampling include verifying compliance with the established RG of 5 mg/kg total pesticide concentration cleanup criterion, monitoring natural degradation of pesticides and potential deposition of contaminated sediments within the wetland.

Five of the ten sample grid locations exhibited total pesticide concentrations above the RG of 5 mg/kg in 2013:

- Grid E = 17.138 mg/kg
- Grid G = 69.131 mg/kg (historical high)
- Grid H = 16.813 mg/kg
- Grid I = 48.532 mg/kg (historical high)
- Grid J = 60.290 mg/kg

Sediment sampling from 1999 to 2002 indicated all grids were below the RG for total pesticide concentrations. The first exceedences of the RG was detected in Grid E and Grid I in 2003. Grid E exhibited an increasing trend of total pesticides with a historical high in 2012 of 21.848 mg/kg. Grid I exhibited a fluctuating trend reaching a high in 2010. From 2012 to 2013 the total pesticide concentration again began an upward trend reaching a historical high of 48.532 mg/kg in 2013. Grid G has been exhibiting a fluctuating trend since 2004. The lowest concentration of total pesticides was 16.537 mg/kg in 2006. The highest concentration of total pesticides was in 2012 at 65.38 mg/kg and 2013 at 69.131 mg/kg. Grid H reached a historical high concentration of total pesticides in 2007. For the next three years, Grid H had a decreasing trend until 2011. The 2013 concentration of total pesticides at 16.813 mg/kg for Grid H is the highest

detection since 2007. After 2002, Grid J exhibited a fluctuating trend reaching a historical low of 5.031 mg/kg in 2008 and a historical high of 66.204 mg/kg in 2009.

Increasing sediment contaminant concentration data also indicates potential source material may remain onsite, and could potentially be contributing to the increasing Contaminants of Concern (COC) concentrations in the shallow aquifer. Additionally, the extent of the pesticide contamination in soils has increased, especially in the wetland area. It was assumed that contamination measured in the surface water and sediments in the RI would diminish once the remedy was implemented. The increasing contamination in the wetland represents a new exposure pathway. Migration of contamination off site in surface water or leaching of contamination to groundwater should be considered as new or expanding exposure pathways.

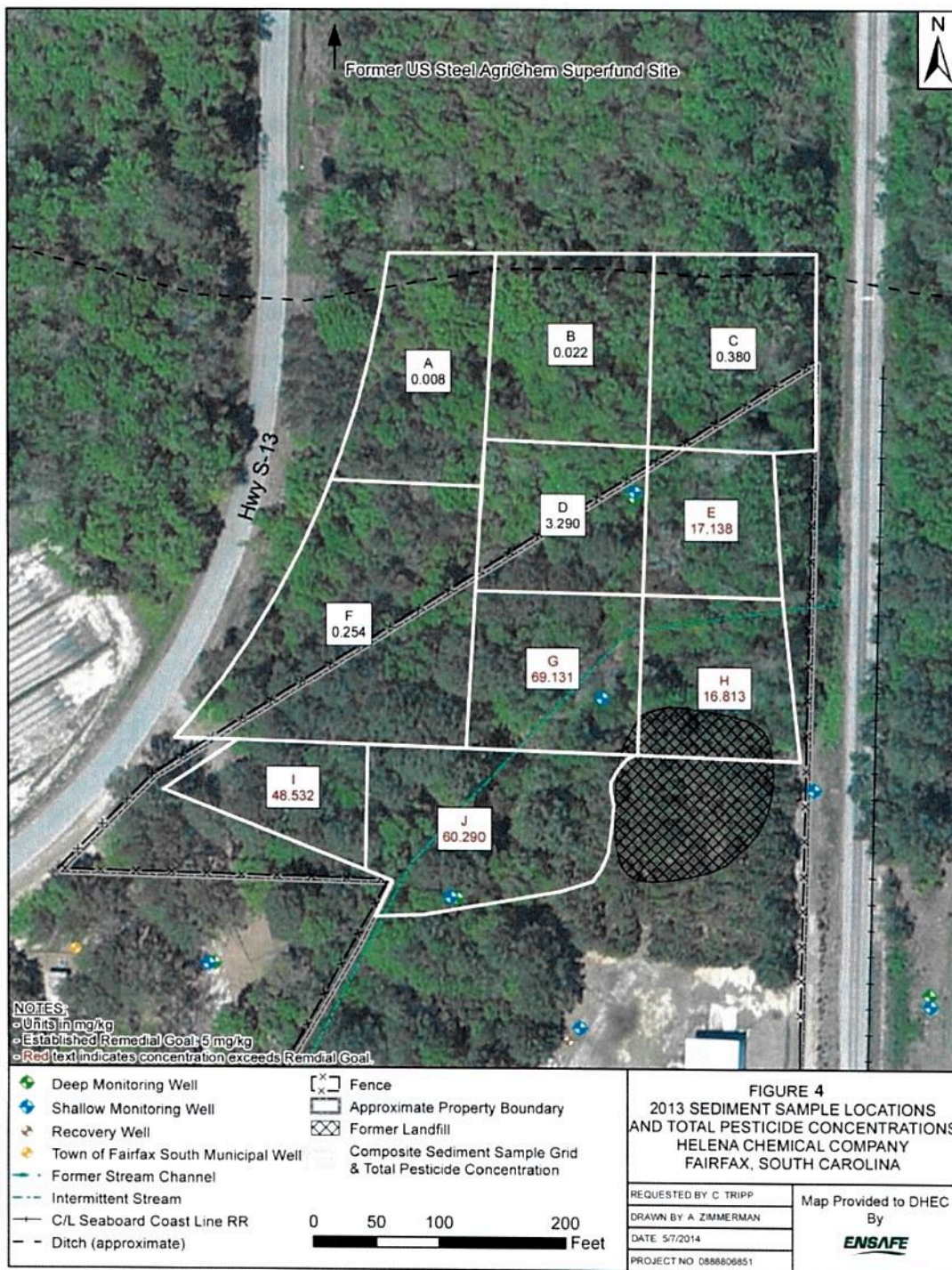


Table 8: Summary of Total Pesticide Concentrations in Sediment from 1999 to 2013.

Sample Grid	Sample Date													
	Dec-99	Feb-01	May-02	Aug-03	Sep-04	Nov-05	Dec-06	Dec-07	Dec-08	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13
A	0.009	0.045	0.072	0.044	0.036	0.110	0.073	0.032	0.027	0.049	0.336	0.035	0.04	0.008
B	0.006	0.031	0.048	0.054	0.028	0.073	0.032	0.009	0.011	0.046	0.313	0.022	0.007	0.022
C	0.066	0.740	0.729	0.389	0.977	1.144	0.785	0.594	0.425	0.791	2.340	4.538	0.632	0.380
D	0.301	0.836	0.262	0.220	1.574	3.315	0.999	0.744	0.609	1.290	4.142	0.908	1.556	3.290
E	0.560	3.671	4.706	7.240	14.600	1.933	5.073	9.094	1.716	9.361	11.346	12.812	21.848	17.138
F	0.050	0.101	0.556	0.451	0.194	0.187	0.095	0.119	0.081	0.211	0.575	0.603	0.617	0.254
G	3.070	2.936	0.866	0.849	52.410	51.292	16.537	48.106	28.077	30.670	35.466	21.38	65.38	69.131
H	0.349	ND	3.138	0.175	3.640	17.480	14.363	45.137	10.468	5.563	7.800	14.705	14.277	16.813
I	0.297	2.289	2.180	5.915	14.901	11.600	32.607	26.637	21.710	19.051	43.091	11.82	34.896	48.532
J	0.128	0.238	0.199	0.157	23.490	13.622	13.965	21.460	5.031	66.204	25.719	5.318	48.195	60.290
Average concentration	0.484	1.210	1.276	1.550	11.185	10.076	8.453	15.193	6.816	13.324	13.113	7.214	18.745	21.586

Notes:

ND

= Not detected

All concentrations are in mg/kg (milligrams per kilograms)

Bold and Italic Text Indicates a Historical High.

Yellow Highlight Indicates Value Exceeds Total Pesticides Remedial Goal (5 mg/kg)

Groundwater Data

Recovery Well Pumping Rates

The recovery well pumping rate is measured by a dedicated flow meter. The average flow rate is approximately 30-40 gpm. Between 34,000 and 36,000 gallons of water is discharged daily to the POTW for treatment, which is well within the Site's permitted discharge limit of 70,000 gallons per day.

Monitoring Well Sampling Frequency

All monitoring wells at the Site are sampled quarterly as recommended in the Remedial Action Work Plan (1997).

No pesticides were detected in groundwater collected from the town of Fairfax's south municipal well and private residential wells located approximately 0.25 and 0.5 miles downgradient to the south of the Site's property line.

Ten pesticides have historically exceeded their respective RGs in Site monitoring wells: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-, beta-, delta-, and gamma-BHC, dieldrin, and toxaphene. The highest concentrations of pesticides were reported at wells within the Site property boundary. Analytical results and groundwater flow direction suggest low concentration pesticides above RGs extend beyond the current shallow monitoring network to the upgradient north and west, and downgradient east and southeast. No significant variations in groundwater flow direction or pesticide concentrations were attributable to seasonal fluctuations.

Historically since 2003, the highest pesticide concentrations exceeding RGs were reported in 2008, 2010, 2013Q3, and 2014Q1 at monitoring wells MW-4 and MW-23, located within the Site property boundary. Based on historical analyte trends per well, concentrations of each pesticide above the RG have either decreased or were stable, with the exception of aldrin and toxaphene, which appear to have increased at six wells located in the vicinity of the former landfill, and on the northern upgradient property line. Historical total pesticide concentrations also suggest increased concentrations on the southeastern Site property line.

Benzene was not detected above the RG in 2013Q4. Historically, low-level concentrations of benzene were detected above the RG of 5 µg/L at deep well MW-3 in 2006 at 7.5 µg/L, 2010 at 6.5 µg/L, and 2011 at 7.45 µg/L.

Chromium and lead were not detected above their respective RGs in 2013Q4. Since 1999, chromium was reported above the RG of 100 µg/L at shallow well MW-24 in 1999 at 1400 µg/L and 2011 at 1600 µg/L, and estimated at deep well MW-23 in 1999 at 160 µg/L. Monitoring wells MW-23 and MW-24 are a nested well pair.

Since 1999, lead was only reported above the RG at shallow well MW-24 during the 1999 monitoring event, with a concentration of 46 µg/L.

Table 9: Number of Site Wells Exceeding the PRG

Parameter Name	Number of Site Wells Exceeding the RG													
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013Q2	2013Q3	2013Q4	2014Q1
Pesticides														
4,4'-DDD	0	0	1	0	2	3	2	1	0	0	2/0	0	1/0	1/0
4,4'-DDE	0	1	1	1	2	2	2	2	2	1/0	0	2/0	2/0	3/0
4,4'-DDT	0	0	2	0	2	2	1	0	0	0	1/0	1/0	1/0	2/0
Aldrin	9	4	2	4	3	5	9	2	2	3/1	3/2	9/2	4/0	4/0
alpha-BHC	10	10	9	5	7	8	7	6	8	7/2	7/2	8/2	9/2	8/2
beta-BHC	13	14	14	12	13	15	14	12	13	13/1	12/3	12/3	13/3	11/2
delta-BHC	8	8	7	5	5	7	7	6	8	6/1	8/1	7/0	7/1	5/0
Dieldrin	10	13	12	12	12	15	14	16	15	12/1	11/0	16/2	12/1	15/1
gamma-BHC (Lindane)	2	1	1	2	1	1	2	3	3	2/0	2/0	2/0	3/0	3/0
Toxaphene	1	2	2	4	1	0	0	3	7	5/1	4/0	4/0	3/0	4/0
Volatile Organic Compounds														
Benzene	0	0	0	1	0	0	0	1	1	0	0	0	0	0
Metals														
Chromium	NA	NA	NA	NA	NA	NA	0	1	1	0	0	0	0	0

Notes:

RG = Remedial Goal

NA = Not analyzed

Well count does not include duplicate samples.

2/3 indicates Historical well network/ Supplemental well network

Based on the groundwater data collected, the recovery system is not performing as intended and groundwater contamination has migrated off-site. In addition to the potential migration of groundwater beyond existing well locations, sediment data collected during 2003-20014 indicate an increasing trend above the RGs in several of the grid locations.

Soil

Soil remediation activities at the Site finished in 1993. No new soil data were collected during the past ten years.

6.5 Site Inspection

The site inspection was conducted on March 25, 2014. A tour of the Site was provided by Edward Brister from Helena Chemical, followed by an inspection of the Site. The inspection team consisted of the following personnel: Candice Teichert (EPA), Charles Williams (SCDHEC), Kayse Jarman (SCDHEC), Donna Moye (SCDHEC), Robert Cole (SCDHEC), and Timothy Kadar (SCDHEC).

A visual inspection of the extraction well, monitoring wells, former landfill area and wetland area was conducted. The groundwater treatment system and associated wells appeared to be in good condition and operational. The sanitary sewer discharge location for the groundwater pumping system was also observed and appeared to be in good condition. Additionally, visual inspection of the two nearby Fairfax Municipal wells was also conducted.

6.6 Interviews

On March 20, 2014, SCDHEC placed a public notice in the Allendale Sun newspaper announcing the commencement of the FYR process for the Site. The notice requested community participation in the FYR process and provided contact information for EPA RPM Candice Teichert and SCDHEC Community Liason Donna Moye. The public comment period closed on April 30, 2014. The public notice is available in Appendix B.

On March 25, 2014, SCDHEC Community Liason Donna Moye, SCDHEC RPM Charles Williams, and SCDHEC Region Staff Tim Pearson interviewed six residents during door-to-door visits on Charleston Avenue, Tinker Town Road, and Byrd Street. Copies of the public notice and EPA Fact Sheet - Superfund Today were left at an additional five homes where no one came to the door. A summary of the interviews is provided in Section 6.6.

A resident's daughter contacted RPM Candice Teichert by email on April 21, 2014 with concerns about how chemicals may have affected her father's health. Her father has been a resident of the

area for 70 years and has worked outdoors for most of that time. RPM Candice Teichert responded by email on April 22, 2014, indicating that cleanup of contaminated groundwater was ongoing and sediment contamination levels are being monitored. Contact information for additional questions was also given in the email, along with the link to the EPA website for more information about the Site. Attempts by RPM Candice Teichert and EPA Community Involvement Coordinator (CIC) Angela Miller to contact the daughter by phone to discuss her concerns were unsuccessful.

The FYR report will be made available for public review once it has been issued. Copies of this document will be placed in the designated public repository: Fairfax City Hall, 635 Allendale Fairfax Highway, Fairfax, South Carolina.

7.0 Remedy Evaluation

7.1 Question A: Is the remedy functioning as intended by the decision documents?

The review of the ground water data, documents, ARARs, risk assumptions, and the site inspection indicate the groundwater recovery remedy is not functioning as intended by the ROD. Groundwater data indicates the groundwater plume is undefined and may have extended beyond the perimeter wells. The Site continues to be enclosed by a chain-link fence to restrict access to the Site. Although the ROD did not require ICs, Ed Brister from Helena Chemical was contacted during the FYR, regarding the status of a restrictive covenant on the Site property. On April 30, 2014, HCC filed a restrictive covenant in the form of a Notice of Hazardous Waste on parcel 124-00-00-013, with the State of South Carolina, County of Allendale. Upon further review, EPA has discovered that restrictive covenants should be placed on additional parcels encompassing the HCC Landfill Site, parcel 124-00-00-014 and 124-00-00-024. ICs should also be placed on adjacent properties that have been impacted by the migration of contaminated groundwater. The ICs are to ensure that future users do not come in contact with contaminated groundwater. Additionally, increasing sediment contaminant concentration data indicates potential source material may remain onsite, and could potentially be contributing to the increasing Contaminants of Concern (COC) concentrations in the shallow aquifer. Additionally, the extent of the pesticide contamination in soils has increased, especially around the wetland area. The increasing contamination in the wetland represents a new exposure pathway.

7.2 Question B. Are the exposure assumptions, toxicity data, clean up levels and RAOs used at the time of remedy selection still valid?

ARARs used at the time of the remedy selection are still valid. The ground water ARARs have not changed for the COCs since the 1993 ROD.

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

The remedy at the HCC Landfill is not functioning as intended. Groundwater data indicates the groundwater plume is undefined and has extended beyond the perimeter wells.

Increasing sediment contaminant concentration data indicates potential source material may remain onsite, and could potentially be contributing to the increasing Contaminants of Concern (COC) concentrations in the shallow aquifer. Additionally, the extent of the pesticide contamination in soils has increased, especially around the wetland area. It was assumed that contamination measured in the surface water and sediments in the RI would diminish once the remedy was implemented. The increasing contamination in the wetland represents a new exposure pathway. Migration of contamination off site in surface water or leaching of contamination to groundwater should also be considered as new or expanding exposure pathways.

Additional restrictive covenants should be placed on parcel 124-00-00-014, 124-00-00-024 and any properties that have been impacted by the migration of contaminated groundwater.

8.0 Issues

Following 15 years of monitoring and treatment, the remedy is not performing as intended in the ROD. Groundwater data indicates that contamination located in both the shallow and deep aquifers has migrated beyond perimeter wells and potentially off-site. Recent sediment samples collected indicate an increasing trend in contaminant concentration and may be contributing to the increasing groundwater contaminant concentrations. The ROD did not require ICs, however groundwater contamination is present at the Site and has potentially migrated off-site.

9.0 Recommendations and Follow-up Actions

Table 10 provides recommendations to address the current issues at the Helena Chemical Co. Landfill Site.

Table 10: Recommendations to Address Current Issues at the HCC Landfill Site

Issue	Recommendations/ Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
Extent of groundwater plume is not adequately delineated.	Install additional groundwater wells to adequately define the extent of the contaminated groundwater	HCC	EPA	3/1/2015	YES	YES
The current groundwater recovery system is not fully capturing the contaminated groundwater plume.	Additional recovery wells need to be installed or the current groundwater recovery system needs to be improved to fully capture the contaminated	HCC	EPA	6/1/2015	NO	YES
There are no institutional controls in place to prevent access to contaminated ground water.	Institutional controls should be implemented on parcel 124-00-00-014 and all other parcels affected by the migration of contaminated groundwater.	HCC	EPA	3/1/2015	YES	YES
Chromium speciation in groundwater needs to be performed to determine the percent of Cr+6.	Chromium speciation should be performed on 20% of the samples to provide information that can be used to determine the potential percentages of Cr+6 in the total chromium results.	HCC	EPA	6/1/2015	NO	YES

Ecological risk assessment data needs to be updated.	Additional risk assessment work should be conducted to incorporate the wider set of receptors including aquatic-dependent wildlife and carnivorous wildlife, as was originally proposed. The contamination in the wetland has increased in magnitude and extent. The current ecological risks at the site exceed the degree of risks understood at the time the wetland mitigation remedy was selected. The increasing concentrations of pesticides in the wetland represent a new exposure pathway. Recommended inclusion of an assessment endpoint to protect the soil invertebrate community.	HCC	EPA	6/1/2015	YES	YES
Toxicity data needs to be updated	The cleanup goal for wetland soils should be revised to create separate goals for individual pesticides using updated toxicity values and exposure assumptions.	HCC	EPA	6/1/2015	NO	YES

*"TBD" refers to To Be Decided

10.0 Protectiveness Statement

At this time, the remedy at the HCC Landfill is not protective of human health and the environment because of the increasing soil contaminant concentrations in the wetland area. Additionally, the migration of contamination offsite in surface water or leaching of contamination to groundwater should be considered as new or expanding exposure pathways. Contaminated groundwater migration is not under control and institutional controls (ICs) have not been implemented.

Contaminated sediment and surface water in the wetland area should be delineated and remediated. Additional monitoring wells need to be installed to determine the extent of groundwater contamination and additional recovery wells may need to be installed to fully capture the contaminated groundwater plume. Institutional Controls governing groundwater should be implemented on the Site property as well as on any adjacent properties onto which the contaminated groundwater plume has migrated.

11.0 Next Review

Five-Year Reviews are to be conducted at this Site until contaminant levels are below the cleanup goals established by EPA in Table 9.2 of the ROD (i.e., drinking water standards for identified COCs). Because Site contaminant levels remain above cleanup levels, the next Five-Year Review will be completed within five years of the date of this report. The due date for the next Five Year Review will be in September 2019.

Appendix A: List of Documents Reviewed

Date	Document
April 12, 1989	Administrative Order of Consent
February 21, 1990	NPL Site Narrative for Helena Chemical Company Landfill, Helena Chemical Company Landfill, Fairfax, South Carolina.
September 9, 1991	Preliminary Health Assessment Report: Helena Chemical Company Landfill
December 31, 1992	Final Remedial Investigation Report: Helena Chemical Company Landfill
January 13, 1993	Feasibility Study: Helena Chemical Company Landfill
September 8, 1993	EPA Superfund Record of Decision: Helena Chemical Company Landfill
September 1, 1995	EPA Superfund Record of Decision: Helena Chemical Company Landfill (First Amendment)
February 5, 1997	Ecological Risk Assessment: Helena Chemical Company Landfill
April 30, 1997	Final Design Report: Helena Chemical Company Landfill
February 11, 1999	ROD Amendment (Second Amendment)
July 21, 1999	Landfill and Wetland Remedial Action Report
September 17, 2004	First Five-Year Review Report: Helena Chemical Company Landfill
September 17, 2009	Second Five-Year Review Report: Helena Chemical Company Landfill
February 23, 2010	Field Sampling Plan and Quality Assurance Project Plan: Helena Chemical Company Landfill
May 28, 2010	2009 Groundwater and Sediment Monitoring Report: Helena Chemical Company Landfill
June 15, 2010	Second Five Year Review: Work Plan in Response to EPA Recommendations to Address Current Issues at the Helena Chemical Company Landfill Site
March 24, 2011	2010 Groundwater and Sediment Monitoring Report: Helena Chemical Company Landfill
April 19, 2012	2011 Groundwater and Sediment Monitoring Report: Helena Chemical Company Landfill
July 23, 2012	Second Five Year Review: Work Plan in Response to EPA Recommendations to Address Current Issues at the Helena Chemical Company Landfill Site, Revision 01
April 17, 2013	2012 Supplemental Activities & Annual Monitoring Report: Helena Chemical Company Landfill
May 28, 2014	2013 Quarterly & Annual Monitoring Report & First Quarter 2014 Report: Helena Chemical Company Landfill

Appendix B: Press Notice

Public Notice

Helena Chemical Company Landfill Fairfax, South Carolina

The U.S. Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (DHEC) are conducting a 5-year review of the Helena Chemical Company Landfill site in Allendale County. This is a federal Superfund site with ongoing cleanup activities. The purpose of the review is to evaluate remedial activities of the past 5 years and make sure that the cleanup continues to protect human health and the environment. During the review, DHEC will conduct interviews with local residents, officials, and others who are familiar with the site. We value input about site conditions and want to hear any concerns of the local community. **You are encouraged to participate in the review by contacting us with your comments or questions through April 30, 2014.**

The 5-year review process is expected to be complete in fall 2014, at which time a report will be written on our findings. Comments about the site will be summarized in the report. The report will be available on EPA's website and at Fairfax City Hall in Fairfax. For more information about this site, please visit:

<http://www.epa.gov/region4/superfund/sites/npl/southcarolina/helchemsc.html>.

For comments, questions, or to participate in an interview, please contact:

Community Involvement: Donna Moye, DHEC Community Liaison, at (803) 898-1382, or by e-mail at moyedd@dhec.sc.gov.

Technical Comments: Candice Teichert, EPA Project Manager, at (404) 562-8821, or by e-mail at teichert.candice@epa.gov.

Please share this with others you know who might be interested.



Appendix C: Interview Forms

Interview Form for Five-Year Review

Site Name: Helena Chemical Company Landfill

Interviewer's Name: Timothy Kadar **Affiliation:** SCDHEC

Interviewee's Name: Candice Teichert, Project Manager **Affiliation:** EPA, SRSEB

Contact Information: U.S. EPA Region 4

61 Forsyth Street
Atlanta, GA 30303

Teichert.Candice@epa.gov

P: 404-562-8821

Type of Interview: Email

Date: April 2, 2014

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Additional contamination at the Site needs to be characterized.

2. What is your assessment of the current performance of the remedy in place at the Site?

The current remedy needs to be optimized and additional contamination needs to be characterized.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? No

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities. No

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy? No

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

The institutional controls currently implemented on the PRP owned property need to be amended.

7. Are you aware of any changes in projected land use(s) at the Site? No

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

The groundwater remedy needs to be optimized and additional contamination needs to be characterized.

Interview Form for Five-Year Review

Site Name: Helena Chemical Company Landfill

Interviewer's Name: Timothy Kadar

Affiliation: SCDHEC

Interviewee's Name: Kayse Jarman, Project Manager

Affiliation: SCDHEC

Contact Information: 2600 Bull Street

Columbia, SC 29201

jarmankb@dhec.sc.gov

P: 803.898.0832

Type of Interview: Email

Date: May 6, 2014

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? *The pump and treat system needs to be optimized and the sediment in the wetlands area needs to be investigated and addressed. There have been no maintenance issues since the last 5 Year Review. Reuse activities have not been discussed.*
2. What is your assessment of the current performance of the remedy in place at the Site? *The remedy needs to be optimized in several ways concerning the groundwater and sediment contamination. A capture zone analysis should be conducted for the groundwater recovery system to verify whether capture of the contaminated groundwater is being achieved. If capture is not being achieved, another recovery well should be installed. The source of the continued sediment contamination should be investigated and addressed. The sediment with elevated levels of contaminants should be remediated.*
3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? *No*
4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities. *Several site visits have been conducted to observe sampling methodology used at the site.*
5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy? *No*
6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues? *Institutional controls need to be corrected and implemented at the site and any other property that is found to be impacted by the groundwater and/or sediment contamination.*
7. Are you aware of any changes in projected land use(s) at the Site? *No*
8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? *Although optimization needs to be implemented, the current remedy is working as designed.*

Interview Form for Five-Year Review

Site Name: Helena Chemical Company Landfill

Interviewer's Name: Timothy Kadar

Affiliation: SCDHEC

Interviewee's Name: Greg Temple, Project Manager

Affiliation: EnSafe

Contact Information: 5724 Summer Trees Drive

Memphis, TN 38134

gtemple@ensafe.com

P: 901.372.7962

Type of Interview: In person during site inspection

Date: March 25, 2014

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? *The pump and treat system is operating as designed. Pesticides in wetlands are continue to exceed RGs in half of the grids (5 out of 10) indicating a possible upgradient influence. No maintenance issues other than routine service during the past five years.*
2. What is your assessment of the current performance of the remedy in place at the Site? *The remedy is operating as designed.*
3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? *No*
4. What is the frequency of Operation and Maintenance activities and site inspections? To your knowledge, has the maintenance been implemented at the site? *Groundwater at the Site is sampled quarterly. Sediments are sampled annually. The results are compiled in an annual report submitted to the EPA and SCDHEC. Maintenance of the pump and treat system are carried out as needed.*
5. Are you aware of any changes in projected land use(s) at the Site? *No*
6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? *The town of Fairfax's north water supply well is located about 0.7 miles upgradient of the site. We would like to remove it from the sampling schedule.*

Interview Form for Five-Year Review

Site Name: Helena Chemical Company Landfill

Interviewer's Name: Timothy Kadar

Affiliation: SCDHEC

Interviewee's Name: Rodney Stanley, Fire Chief

Affiliation: Allendale County

Contact Information: 803.686.1080

Type of Interview: Phone

Date: March 21, 2014

Interview Category: Local Government

1. Are you aware of the environmental issues and/or cleanup activities at the Helena Chemical Co. Landfill site? *Yes.*
2. What are your views or concerns about site conditions, problems, or related concerns? *None. However, Chief Stanley expressed concerns regarding the former Helena Chemical Company site located at 431 Frontage Road, Allendale, Allendale County, SC. The site has been operating as a metal recycler including crushing cars (Don's Scrap Metal Recycling). The company has erected a metal fence obscuring the site from view. County officials aren't sure what is happening on site anymore.*
3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? *None. Residents have been complaining of gasoline odors at Don's Scrap Metal Recycling.*
4. What effect has this site had on the surrounding community? *None.*
5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy? *No.*
6. Are you aware of any changes in projected land use(s) at or near the Site? *None. Some industries are reopening near Don's Scrap Metal Recycling.*
7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? *None.*

Interview Form for Five-Year Review

Site Name: Helena Chemical Company Landfill

Interviewer's Name: Timothy Kadar

Affiliation: SCDHEC

Interviewee's Name: James Rice, Utilities Director

Affiliation: Town of Fairfax

Contact Information: 803.632.3799

Type of Interview: In person

Date: March 25, 2014

Interview Category: Local Government

1. Are you aware of the environmental issues and/or cleanup activities at the Helena Chemical Co. Landfill site? *Yes.*
2. What are your views or concerns about site conditions, problems, or related concerns? *None.*
3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? *None.*
4. What effect has this site had on the surrounding community? *None.*
5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy? *No.*
6. Are you aware of any changes in projected land use(s) at or near the Site? *None.*
7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? *None.*

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST															
I. SITE INFORMATION															
Site Name: Helena Chemical Company Landfill		Date of Inspection: March 25, 2014													
Location and Region: Fairfax, Allendale County, SC, Region 4		EPA ID: SCD058753971													
Agency, Office or Company Leading the Five-Year Review: SCDHEC		Weather/Temperature: 55 and sunny													
Remedy Includes: (Check all that apply) <table border="0" style="width: 100%;"> <tr> <td><input type="checkbox"/> Landfill cover/containment</td> <td><input type="checkbox"/> Monitored natural attenuation</td> </tr> <tr> <td><input type="checkbox"/> Access controls</td> <td><input type="checkbox"/> Ground water containment</td> </tr> <tr> <td><input type="checkbox"/> Institutional controls</td> <td><input type="checkbox"/> Vertical barrier walls</td> </tr> <tr> <td><input checked="" type="checkbox"/> Ground water pump and treatment</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Surface water collection and treatment</td> <td></td> </tr> <tr> <td colspan="2"><input checked="" type="checkbox"/> Other: <u>Discharge into the town of Fairfax's POTW</u></td> </tr> </table>				<input type="checkbox"/> Landfill cover/containment	<input type="checkbox"/> Monitored natural attenuation	<input type="checkbox"/> Access controls	<input type="checkbox"/> Ground water containment	<input type="checkbox"/> Institutional controls	<input type="checkbox"/> Vertical barrier walls	<input checked="" type="checkbox"/> Ground water pump and treatment		<input type="checkbox"/> Surface water collection and treatment		<input checked="" type="checkbox"/> Other: <u>Discharge into the town of Fairfax's POTW</u>	
<input type="checkbox"/> Landfill cover/containment	<input type="checkbox"/> Monitored natural attenuation														
<input type="checkbox"/> Access controls	<input type="checkbox"/> Ground water containment														
<input type="checkbox"/> Institutional controls	<input type="checkbox"/> Vertical barrier walls														
<input checked="" type="checkbox"/> Ground water pump and treatment															
<input type="checkbox"/> Surface water collection and treatment															
<input checked="" type="checkbox"/> Other: <u>Discharge into the town of Fairfax's POTW</u>															
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached															
II. INTERVIEWS (check all that apply)															
1. O&M Site Manager	<u>Greg Temple</u> Name	<u>EnSafe</u> Title	<u>03/25/2014</u> Date												
Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: _____ Problems, suggestions <input type="checkbox"/> Report attached: <u>Appendix C includes interview forms for FYR</u>															
2. O&M Staff	_____ Name	_____ Title	<u>mm/dd/yyyy</u> Date												
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: _____ Problems/suggestions <input type="checkbox"/> Report attached: _____															

3.	Local Regulatory Authorities and Response Agencies (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.			
Agency <u>EPA Region 4</u>				
Contact	<u>Candice Teichart</u>	<u>Remedial</u>	<u>04/02/2014</u>	
	Name	<u>Project</u>	Date	
		<u>Managar</u>	<u>(404) 562-8821</u>	
		Title	Phone No.	
Problems/suggestions <input type="checkbox"/> Report attached: <u>Appendix C includes interview forms for FYR</u>				
Agency <u>SCDHEC</u>				
Contact	<u>Kayse Jarman</u>	<u>Environmental</u>	<u>05/06/2014</u>	
		<u>Engineer</u>	Date	
			<u>(803) 898-0832</u>	
		Title	Phone No.	
Problems/suggestions <input type="checkbox"/> Report attached: <u>Appendix C includes interview forms for FYR</u>				
Agency <u>Fire Department of Allendale County</u>				
Contact	<u>Rodney Stanley</u>	<u>Fire Chief</u>	<u>3/21/2014</u>	
	Name	Title	Date	
			<u>(803) 584-2586</u>	
			Phone No.	
Problems/suggestions <input type="checkbox"/> Report attached: <u>Appendix C includes interview forms for FYR</u>				
Agency <u>Town of Fairfax</u>				
Contact	<u>James Rice</u>	<u>Utilities</u>	<u>03/25/2014</u>	
	Name	<u>Director</u>	Date	
			<u>(803) 632-3799</u>	
		Title	Phone No.	
Problems/suggestions <input type="checkbox"/> Report attached: <u>Appendix C includes interview forms for FYR</u>				
Agency _____				
Contact	_____	_____	_____	
	Name	Title	Date	
			Phone No.	
Problems/suggestions <input type="checkbox"/> Report attached: _____				
4.	Other Interviews (optional) <input type="checkbox"/> Report attached:			
III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)				
1.	O&M Documents			
	<input checked="" type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	
	<input type="checkbox"/> As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	
	<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	
			<input type="checkbox"/> N/A	
			<input type="checkbox"/> N/A	
			<input type="checkbox"/> N/A	
Remarks: _____				
2.	Site-Specific Health and Safety Plan			
	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
	<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	
			<input type="checkbox"/> N/A	
Remarks: <u>EnSafe was conducting a sampling event during our site inspection. All documents were available and current.</u>				

3.	O&M and OSHA Training Records	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____				
4.	Permits and Service Agreements			
	<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Waste disposal, POTW	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Other permits: <u>NPDES</u>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____				
5.	Gas Generation Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
6.	Settlement Monument Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
7.	Ground Water Monitoring Records	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____				
8.	Leachate Extraction Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
9.	Discharge Compliance Records			
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Water (effluent)	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____				
10.	Daily Access/Security Logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
IV. O&M COSTS				
1.	O&M Organization			
	<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for state		
	<input type="checkbox"/> PRP in-house	<input checked="" type="checkbox"/> Contractor for PRP		
	<input type="checkbox"/> Federal facility in-house	<input type="checkbox"/> Contractor for Federal facility		
	<input type="checkbox"/> _____			

2. **O&M Cost Records**

- ☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost	<input type="checkbox"/> Breakdown attached
From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost	<input type="checkbox"/> Breakdown attached
From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost	<input type="checkbox"/> Breakdown attached
From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost	<input type="checkbox"/> Breakdown attached
From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost	<input type="checkbox"/> Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: Ice storm damage to trees resulted in one tree laying on the northeast section of the fence. Additionally, there were many branches and tree tops that were threatening the integrity of the fence. Site is an active business with access restricted to a pair of locking gates.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. Implementation and Enforcement			
Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by): _____			
Frequency: _____			
Responsible party/agency: _____			
Contact _____	_____	mm/dd/yyyy _____	
Name	Title	Date	Phone no.
Reporting is up to date		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Reports are verified by the lead agency		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Violations have been reported		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
Other problems or suggestions: <input type="checkbox"/> Report attached			

2. Adequacy	<input type="checkbox"/> ICs are adequate	<input checked="" type="checkbox"/> ICs are inadequate	<input type="checkbox"/> N/A
Remarks: <u>There are no institutional controls currently in place on the Site.</u>			

D. General			
1. Vandalism/Trespassing	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No vandalism evident	
Remarks: <u>Illegal dumping of household garbage takes place on the southern edge of the property. The southern fence line is approximately 100 feet north of the southern boundary of the site. The fence line needs to be relocated to the actual property line.</u>			
2. Land Use Changes On Site	<input checked="" type="checkbox"/> N/A		
Remarks: _____			
3. Land Use Changes Off Site	<input checked="" type="checkbox"/> N/A		
Remarks: _____			

VI. GENERAL SITE CONDITIONS			
A. Roads	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1. Roads Damaged	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Roads adequate	<input type="checkbox"/> N/A
Remarks: _____			
B. Other Site Conditions			
Remarks: _____			

VII. GROUND WATER/SURFACE WATER REMEDIES			
		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
A. Ground Water Extraction Wells, Pumps and Pipelines		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A

1. Pumps, Wellhead Plumbing and Electrical <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: _____
2. Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
3. Spare Parts and Equipment <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks: _____
B. Surface Water Collection Structures, Pumps and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1. Collection Structures, Pumps and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
2. Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
3. Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks: _____
C. Treatment System <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1. Treatment Train (check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters: _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____ <input type="checkbox"/> Others: _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of ground water treated annually: _____ <input type="checkbox"/> Quantity of surface water treated annually: _____ Remarks: _____

2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs maintenance Remarks: _____
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
5.	Treatment Building(s) <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks: _____
6.	Monitoring Wells (pump and treatment remedy) <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: <u>Wells were in the process of being sampled during visit. Any faulty lock, broken hinge, etc., etc., were addressed during site inspection.</u>
D. Monitoring Data	
1.	Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
2.	Monitoring Data Suggests: <input type="checkbox"/> Ground water plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining
E. Monitored Natural Attenuation	
1.	Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____
VIII. OTHER REMEDIES	
If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.	
IX. OVERALL OBSERVATIONS	
A.	Implementation of the Remedy Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedy needs to be optimized in order to contain and remove contaminants from the ground water.</u>
B.	Adequacy of O&M

	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>There are no known O&M issues.</u>
C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>There are no known early indications of potential remedy problems.</u>
D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>There are no known opportunities for optimization.</u>

Appendix E
Historical Groundwater Results from 2003 to 2014Q1
Pesticides and Metals for MW-2

Sample Location:	Sample Date:	Sample Type:	RG	Units	MW-2																											
					08/21/2003		09/10/2004		11/16/2005		12/13/2006		12/04/2007		12/03/2008		12/09/2009		03/17/2010		11/30/2010		12/10/2011		06/18/2012		09/04/2013		12/11/2013		03/26/2014	
					N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte																																
Pesticides																																
4,4'-DDD	0.1	µg/L			0.02 U	0.02 U	0.0067 J	0.021 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
4,4'-DDE	0.1	µg/L			0.02 U	0.02 U	0.0067 J	0.021 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
4,4'-DDT	0.1	µg/L			0.02 U	0.02 U	0.0067 J	0.021 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Aldrin	0.002	µg/L			0.01 U	0.01 U	0.0058 U	0.01 U	0.01 U3	0.01 U	NA	0.0051 U3	0.0021 U1	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U		
alpha-BHC	0.006	µg/L			0.01 U	0.01 U	0.0050 U	0.01 U	0.01 U3	0.01 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
alpha-Chlordane	2	µg/L			0.01 U	0.01 U	0.0059 U	0.01 U	0.01 U3	0.01 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
beta-BHC	0.02	µg/L			0.01 U	0.01 U	0.0058 U	0.01 U	0.01 U3	0.01 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
delta-BHC	0.006	µg/L			0.01 U	0.01 U	0.0058 U	0.01 U	0.01 U3	0.01 U	NA	0.0056 U3	0.0062 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U		
Dieldrin	0.002	µg/L			0.01 U	0.01 U	0.0056 U	0.01 U	0.01 U3	0.01 U	NA	0.0059 J	0.0071 U1	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U		
Endosulfen I		µg/L			0.02 U	0.02 U	0.0056 U	0.02 U	0.02 U3	0.02 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Endosulfen II		µg/L			0.02 U	0.02 U	0.0056 U	0.02 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Endosulfen sulfate		µg/L			0.02 U	0.02 U	0.0056 U	0.02 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Endrin	2	µg/L			0.02 U	0.02 U	0.0056 U	0.02 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Fixin aldehyde		µg/L			0.02 U	0.02 U	0.0056 U	0.02 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Endrin ketone		µg/L			0.02 U	0.02 U	0.0056 U	0.02 U	0.02 U3	0.02 U	NA	0.04 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
gamma-BHC (Lindane)	0.2	µg/L			0.01 U	0.01 U	0.0059 U	0.01 U	0.01 U3	0.01 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
gamma-Chlordane	2	µg/L			0.01 U	0.01 U	0.0059 U	0.01 U	0.01 U3	0.01 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Heptachlor	0.4	µg/L			0.01 U	0.01 U	0.0058 U	0.01 U	0.01 U3	0.01 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Heptachlor epoxide		µg/L			0.01 U	0.01 U	0.0058 U	0.01 U	0.01 U3	0.01 U	NA	0.02 U3	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U		
Methoxychlor		µg/L			0.1 U	0.1 U	0.0056 U	0.1 U	0.1 U3	0.1 U	NA	0.2 U3	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
Toxaphene	3	µg/L			1 U	1 U	0.0056 U	1 U	1 U3	1 U	NA	1 U3	0.26 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
Total Pesticides		µg/L			U	U	0.025	U	U	U	NA	0.00268	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Metals																																
Chromium	100	µg/L			NA	NA	NA	NA	NA	NA	5 J	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U		
Lead	15	µg/L			NA	NA	NA	NA	NA	NA	1.4 J	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	

Notes:
µg/L = Micrograms per liter
RG = Remedial Goal
a = Concentration Exceeds RG
N = Normal/Primary Sample
FD = Field Duplicate
U = Not Detected
J = Estimated value
D = The value was obtained during a secondary dilution.
NJ = Analyte was presumptively present and tentatively identified at the approximate concentration listed.
NA = Not analyzed
= Highest concentration exceeding RG during posted timeframe

[illegible]

Appendix E

Historical Groundwater Results from 2003 to 2014Q1

Pesticides and Metals for MW-4

[illegible]

Notes:

	Micrograms per liter	
Potential Goal		
Concentration Exceeds Hg		
Normal/Primary Sample		
Field Duplicate		
Not Detected		
Estimated value		
The value was obtained due		
Analyze was presumptively		
Net analyzed		
Highest concentration across		

Appendix E

Sample Location:	Site-14	Site-19	Site-24	Site-29	Site-34	Site-39	Site-44	Site-49	Site-54	Site-59	Site-64	Site-69	Site-74	Site-79	Site-84	Site-89	Site-94	Site-99	Site-104	Site-109	Site-114	Site-119	Site-124	Site-129	Site-134	Site-139	Site-144	Site-149	Site-154	Site-159	Site-164	Site-169	Site-174	Site-179	Site-184	Site-189	Site-194	Site-199	Site-204	Site-209	Site-214	Site-219	Site-224	Site-229	Site-234	Site-239	Site-244	Site-249	Site-254	Site-259	Site-264	Site-269	Site-274	Site-279	Site-284	Site-289	Site-294	Site-299	Site-304	Site-309	Site-314	Site-319	Site-324	Site-329	Site-334	Site-339	Site-344	Site-349	Site-354	Site-359	Site-364	Site-369	Site-374	Site-379	Site-384	Site-389	Site-394	Site-399	Site-404	Site-409	Site-414	Site-419	Site-424	Site-429	Site-434	Site-439	Site-444	Site-449	Site-454	Site-459	Site-464	Site-469	Site-474	Site-479	Site-484	Site-489	Site-494	Site-499	Site-504	Site-509	Site-514	Site-519	Site-524	Site-529	Site-534	Site-539	Site-544	Site-549	Site-554	Site-559	Site-564	Site-569	Site-574	Site-579	Site-584	Site-589	Site-594	Site-599	Site-604	Site-609	Site-614	Site-619	Site-624	Site-629	Site-634	Site-639	Site-644	Site-649	Site-654	Site-659	Site-664	Site-669	Site-674	Site-679	Site-684	Site-689	Site-694	Site-699	Site-704	Site-709	Site-714	Site-719	Site-724	Site-729	Site-734	Site-739	Site-744	Site-749	Site-754	Site-759	Site-764	Site-769	Site-774	Site-779	Site-784	Site-789	Site-794	Site-799	Site-804	Site-809	Site-814	Site-819	Site-824	Site-829	Site-834	Site-839	Site-844	Site-849	Site-854	Site-859	Site-864	Site-869	Site-874	Site-879	Site-884	Site-889	Site-894	Site-899	Site-904	Site-909	Site-914	Site-919	Site-924	Site-929	Site-934	Site-939	Site-944	Site-949	Site-954	Site-959	Site-964	Site-969	Site-974	Site-979	Site-984	Site-989	Site-994	Site-999	Site-1004	Site-1009	Site-1014	Site-1019	Site-1024	Site-1029	Site-1034	Site-1039	Site-1044	Site-1049	Site-1054	Site-1059	Site-1064	Site-1069	Site-1074	Site-1079	Site-1084	Site-1089	Site-1094	Site-1099	Site-1104	Site-1109	Site-1114	Site-1119	Site-1124	Site-1129	Site-1134	Site-1139	Site-1144	Site-1149	Site-1154	Site-1159	Site-1164	Site-1169	Site-1174	Site-1179	Site-1184	Site-1189	Site-1194	Site-1199	Site-1204	Site-1209	Site-1214	Site-1219	Site-1224	Site-1229	Site-1234	Site-1239	Site-1244	Site-1249	Site-1254	Site-1259	Site-1264	Site-1269	Site-1274	Site-1279	Site-1284	Site-1289	Site-1294	Site-1299	Site-1304	Site-1309	Site-1314	Site-1319	Site-1324	Site-1329	Site-1334	Site-1339	Site-1344	Site-1349	Site-1354	Site-1359	Site-1364	Site-1369	Site-1374	Site-1379	Site-1384	Site-1389	Site-1394	Site-1399	Site-1404	Site-1409	Site-1414	Site-1419	Site-1424	Site-1429	Site-1434	Site-1439	Site-1444	Site-1449	Site-1454	Site-1459	Site-1464	Site-1469	Site-1474	Site-1479	Site-1484	Site-1489	Site-1494	Site-1499	Site-1504	Site-1509	Site-1514	Site-1519	Site-1524	Site-1529	Site-1534	Site-1539	Site-1544	Site-1549	Site-1554	Site-1559	Site-1564	Site-1569	Site-1574	Site-1579	Site-1584	Site-1589	Site-1594	Site-1599	Site-1604	Site-1609	Site-1614	Site-1619	Site-1624	Site-1629	Site-1634	Site-1639	Site-1644	Site-1649	Site-1654	Site-1659	Site-1664	Site-1669	Site-1674	Site-1679	Site-1684	Site-1689	Site-1694	Site-1699	Site-1704	Site-1709	Site-1714	Site-1719	Site-1724	Site-1729	Site-1734	Site-1739	Site-1744	Site-1749	Site-1754	Site-1759	Site-1764	Site-1769	Site-1774	Site-1779	Site-1784	Site-1789	Site-1794	Site-1799	Site-1804	Site-1809	Site-1814	Site-1819	Site-1824	Site-1829	Site-1834	Site-1839	Site-1844	Site-1849	Site-1854	Site-1859	Site-1864	Site-1869	Site-1874	Site-1879	Site-1884	Site-1889	Site-1894	Site-1899	Site-1904	Site-1909	Site-1914	Site-1919	Site-1924	Site-1929	Site-1934	Site-1939	Site-1944	Site-1949	Site-1954	Site-1959	Site-1964	Site-1969	Site-1974	Site-1979	Site-1984	Site-1989	Site-1994	Site-1999	Site-2004	Site-2009	Site-2014	Site-2019	Site-2024	Site-2029	Site-2034	Site-2039	Site-2044	Site-2049	Site-2054	Site-2059	Site-2064	Site-2069	Site-2074	Site-2079	Site-2084	Site-2089	Site-2094	Site-2099	Site-2104	Site-2109	Site-2114	Site-2119	Site-2124	Site-2129	Site-2134	Site-2139	Site-2144	Site-2149	Site-2154	Site-2159	Site-2164	Site-2169	Site-2174	Site-2179	Site-2184	Site-2189	Site-2194	Site-2199	Site-2204	Site-2209	Site-2214	Site-2219	Site-2224	Site-2229	Site-2234	Site-2239	Site-2244	Site-2249	Site-2254	Site-2259	Site-2264	Site-2269	Site-2274	Site-2279	Site-2284	Site-2289	Site-2294	Site-2299	Site-2304	Site-2309	Site-2314	Site-2319	Site-2324	Site-2329	Site-2334	Site-2339	Site-2344	Site-2349	Site-2354	Site-2359	Site-2364	Site-2369	Site-2374	Site-2379	Site-2384	Site-2389	Site-2394	Site-2399	Site-2404	Site-2409	Site-2414	Site-2419	Site-2424	Site-2429	Site-2434	Site-2439	Site-2444	Site-2449	Site-2454	Site-2459	Site-2464	Site-2469	Site-2474	Site-2479	Site-2484	Site-2489	Site-2494	Site-2499	Site-2504	Site-2509	Site-2514	Site-2519	Site-2524	Site-2529	Site-2534	Site-2539	Site-2544	Site-2549	Site-2554	Site-2559	Site-2564	Site-2569	Site-2574	Site-2579	Site-2584	Site-2589	Site-2594	Site-2599	Site-2604	Site-2609	Site-2614	Site-2619	Site-2624	Site-2629	Site-2634	Site-2639	Site-2644	Site-2649	Site-2654	Site-2659	Site-2664	Site-2669	Site-2674	Site-2679	Site-2684	Site-2689	Site-2694	Site-2699	Site-2704	Site-2709	Site-2714	Site-2719	Site-2724	Site-2729	Site-2734	Site-2739	Site-2744	Site-2749	Site-2754	Site-2759	Site-2764	Site-2769	Site-2774	Site-2779	Site-2784	Site-2789	Site-2794	Site-2799	Site-2804	Site-2809	Site-2814	Site-2819	Site-2824	Site-2829	Site-2834	Site-2839	Site-2844	Site-2849	Site-2854	Site-2859	Site-2864	Site-2869	Site-2874	Site-2879	Site-2884	Site-2889	Site-2894	Site-2899	Site-2904	Site-2909	Site-2914	Site-2919	Site-2924	Site-2929	Site-2934	Site-2939	Site-2944	Site-2949	Site-2954	Site-2959	Site-2964	Site-2969	Site-2974	Site-2979	Site-2984	Site-2989	Site-2994	Site-2999	Site-3004	Site-3009	Site-3014	Site-3019	Site-3024	Site-3029	Site-3034	Site-3039	Site-3044	Site-3049	Site-3054	Site-3059	Site-3064	Site-3069	Site-3074	Site-3079	Site-3084	Site-3089	Site-3094	Site-3099	Site-3104	Site-3109	Site-3114	Site-3119	Site-3124	Site-3129	Site-3134	Site-3139	Site-3144	Site-3149	Site-3154	Site-3159	Site-3164	Site-3169	Site-3174	Site-3179	Site-3184	Site-3189	Site-3194	Site-3199	Site-3204	Site-3209	Site-3214	Site-3219	Site-3224	Site-3229	Site-3234	Site-3239	Site-3244	Site-3249	Site-3254	Site-3259	Site-3264	Site-3269	Site-3274	Site-3279	Site-3284	Site-3289	Site-3294	Site-3299	Site-3304	Site-3309	Site-3314	Site-3319	Site-3324	Site-3329	Site-3334	Site-3339	Site-3344	Site-3349	Site-3354	Site-3359	Site-3364	Site-3369	Site-3374	Site-3379	Site-3384	Site-3389	Site-3394	Site-3399	Site-3404	Site-3409	Site-3414	Site-3419	Site-3424	Site-3429	Site-3434	Site-3439	Site-3444	Site-3449	Site-3454	Site-3459	Site-3464	Site-3469	Site-3474	Site-3479	Site-3484	Site-3489	Site-3494	Site-3499	Site-3504	Site-3509	Site-3514	Site-3519	Site-3524	Site-3529	Site-3534	Site-3539	Site-3544	Site-3549	Site-3554	Site-3559	Site-3564	Site-3569	Site-3574	Site-3579	Site-3584	Site-3589	Site-3594	Site-3599	Site-3604	Site-3609	Site-3614	Site-3619	Site-3624	Site-3629	Site-3634	Site-3639	Site-3644	Site-3649	Site-3654	Site-3659	Site-3664	Site-3669	Site-3674	Site-3679	Site-3684	Site-3689	Site-3694	Site-3699	Site-3704	Site-3709	Site-3714	Site-3719	Site-3724	Site-3729	Site-3734	Site-3739	Site-3744	Site-3749	Site-3754	Site-3759	Site-3764	Site-3769	Site-3774	Site-3779	Site-3784	Site-3789	Site-3794	Site-3799	Site-3804	Site-3809	Site-3814	Site-3819	Site-3824	Site-3829	Site-3834	Site-3839	Site-3844	Site-3849	Site-3854	Site-3859	Site-3864	Site-3869	Site-3874	Site-3879	Site-3884	Site-3889	Site-3894	Site-3899	Site-3904	Site-3909	Site-3914	Site-3919	Site-3924	Site-3929	Site-3934	Site-3939	Site-3944	Site-3949	Site-3954	Site-3959	Site-3964	Site-3969	Site-3974	Site-3979	Site-3984	Site-3989	Site-3994	Site-3999	Site-4004	Site-4009	Site-4014	Site-4019	Site-4024	Site-4029	Site-4034	Site-4039	Site-4044	Site-4049	Site-4054	Site-4059	Site-4064	Site-4069	Site-4074	Site-4079	Site-4084	Site-4089	Site-4094	Site-4099	Site-4104	Site-4109	Site-4114	Site-4119	Site-4124	Site-4129	Site-4134	Site-4139	Site-4144	Site-4149	Site-4154	Site-4159	Site-4164	Site-4169	Site-4174	Site-4179	Site-4184	Site-4189	Site-4194	Site-4199	Site-4204	Site-4209	Site-4214	Site-4219	Site-4224	Site-4229	Site-4234	Site-4239	Site-4244	Site-4249	Site-4254	Site-4259	Site-4264	Site-4269	Site-4274	Site-4279	Site-4284	Site-4289	Site-4294	Site-4299	Site-4304	Site-4309	Site-4314	Site-4319	Site-4324	Site-4329	Site-4334	Site-4339	Site-4344	Site-4349	Site-4354	Site-4359	Site-4364	Site-4369	Site-4374	Site-4379	Site-4384	Site-4389	Site-4394	Site-4399	Site-4404	Site-4409	Site-4414	Site-4419	Site-4424	Site-4429	Site-4434	Site-4439	Site-4444	Site-4449	Site-4454	Site-4459	Site-4464	Site-4469	Site-4474	Site-4479	Site-4484	Site-4489	Site-4494	Site-4499	Site-4504	Site-4509	Site-4514	Site-4519	Site-4524	Site-4529	Site-4534	Site-4539	Site-4544	Site-4549	Site-4554	Site-4559	Site-4564	Site-4569	Site-4574	Site-4579	Site-4584	Site-4589	Site-4594	Site-4599	Site-4604	Site-4609	Site-4614	Site-4619	Site-4624	Site-4629	Site-4634	Site-4639	Site-4644	Site-4649	Site-4654	Site-4659	Site-4664	Site-4669	Site-4674	Site-4679	Site-4684	Site-4689	Site-4694	Site-4699	Site-4704	Site-4709	Site-4714	Site-4719	Site-4724	Site-4729	Site-4734	Site-4739	Site-4744	Site-4749	Site-4754	Site-4759	Site-4764	Site-4769	Site-4774	Site-4779	Site-4784	Site-4789	Site-4794	Site-4799	Site-4804	Site-4809	Site-4814	Site-4819	Site-4824	Site-4829	Site-4834	Site-4839	Site-4844	Site-4849	Site-4854	Site-4859	Site-4864	Site-4869	Site-4874	Site-4879	Site-4884	Site-4889	Site-4894	Site-4899	Site-4904	Site-4909	Site-4914	Site-4919	Site-4924	Site-4929	Site-4934	Site-4939	Site-4944	Site-4949	Site-4954	Site-4959	Site-4964	Site-4969	Site-4974	Site-4979	Site-4984	Site-4989	Site-4994	Site-4999	Site-5004	Site-5009	Site-5014	Site-5019	Site-5024	Site-5029	Site-5034	Site-5039	Site-5044	Site-5049	Site-5054	Site-5059	Site-5064	Site-5069	Site-5074	Site-5079	Site-5084	Site-5089	Site-5094	Site-5099	Site-5104	Site-5109	Site-5114	Site-5119	Site-5124	Site-5129	Site-5134	Site-5139	Site-5144	Site-5149	Site-5154	Site-5159	Site-5164	Site-5169	Site-5174	Site-5179	Site-5184	Site-5189	Site-5194	Site-5199	Site-5204	Site-5209	Site-5214	Site-5219	Site-5224	Site-5229	Site-5234	Site-5239	Site-5244	Site-5249	Site-5254	Site-5259	Site-5264	Site-5269	Site-5274	Site-5279	Site-5284	Site-5289	Site-5294	Site-5299	Site-5304	Site-5309	Site-5314	Site-5319	Site-5324	Site-5329	Site-5334	Site-5339	Site-5344	Site-5349	Site-5354	Site-5359	Site-5364	Site-5369	Site-5374	Site-5379	Site-5384	Site-5389	Site-5394	Site-5399	Site-5404	Site-5409	Site-5414	Site-5419	Site-5424	Site-5429	Site-5434	Site-5439	Site-5444	Site-5449	Site-5454	Site-5459	Site-5464	Site-5469	Site-5474	Site-5479	Site-5484	Site-5489	Site-5494	Site-5499	Site-5504	Site-5509	Site-5514	Site-5519	Site-5524	Site-5529	Site-5534	Site-5539	Site-5544	Site-5549	Site-5554	Site-5559	Site-5564	Site-5569	Site-5574	Site-5579	Site-5584	Site-5589	Site-5594	Site-5599	Site-5604	Site-5609	Site-5614	Site-5619	Site-5624	Site-5629	Site-5634	Site-5639	Site-5644	Site-5649	Site-5654	Site-5659	Site-5664	Site-5669	Site-5674	Site-5679	Site-5684	Site-5689	Site-5694	Site-5699	Site-5704	Site-5709	Site-5714	Site-5719	Site-5724	Site-5729	Site-5
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Appendix E
Historical Groundwater Results from 2003 to 2014Q1
Pesticides and Metals for MW-5

Sample Location:	MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5		MW-5	
	08/20/2003		09/09/2004		11/17/2006		12/12/2006		12/07/2007		12/04/2008		12/09/2009		03/16/2010		11/30/2010		12/01/2011		12/11/2012		06/18/2013		09/04/2013		12/12/2013		03/24/2014	
Sample Date:	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Type:																														
Units																														
RG																														
Analyte																														
Pesticides																														
4,4'-DDD	0.1	µg/L	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1
4,4'-DDE	0.1	µg/L	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1
4,4'-DDT	0.1	µg/L	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1	0.02	0.1
Alachlor	0.002	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
alpha-BHC	0.006	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
alpha-Chlordane	2	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
beta-BHC	0.002	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
delta-BHC	0.006	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Deltamethrin	0.002	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Endosulfan I		µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Endosulfan II		µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Endosulfan sulfate		µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Endrin	2	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Endrin aldehyde		µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Endrin ketone		µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
gamma-BHC (Lindane)	0.2	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
gamma-Chlordane	2	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Heptachlor	0.4	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Heptachlor epoxide		µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Methoxychlor		µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Toxaphene	3	µg/L	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Total Pesticides		µg/L	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
Metals																														
Chromium	500	µg/L	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Cadmium	15	µg/L	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Copper	15	µg/L	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4

= Micrograms per liter
 = Remedial Goal
 = Concentration Exceeds RG
 = Non-Remedial Sample
 = Field Duplicate
 = Not detected
 = Estimated value
 = The value was obtained during a secondary dilution
 = Analyte was presumptively present and tentatively identified at the approximate concentration listed.
 = Not analyzed

Appendix E

[illegible]

PC	0.000000 mg/liter	GC
CC	0.000000 mg/liter	GC
AC	0.000000 mg/liter	GC
BC	0.000000 mg/liter	GC
EC	0.000000 mg/liter	GC
FC	0.000000 mg/liter	GC
GC	0.000000 mg/liter	GC
HC	0.000000 mg/liter	GC
IC	0.000000 mg/liter	GC
JC	0.000000 mg/liter	GC
KC	0.000000 mg/liter	GC
LC	0.000000 mg/liter	GC
MC	0.000000 mg/liter	GC
NC	0.000000 mg/liter	GC
OC	0.000000 mg/liter	GC
PC	0.000000 mg/liter	GC
QC	0.000000 mg/liter	GC
RC	0.000000 mg/liter	GC
SC	0.000000 mg/liter	GC
TC	0.000000 mg/liter	GC
UC	0.000000 mg/liter	GC
VC	0.000000 mg/liter	GC
WC	0.000000 mg/liter	GC
XC	0.000000 mg/liter	GC
YC	0.000000 mg/liter	GC
ZC	0.000000 mg/liter	GC
AD	0.000000 mg/liter	GC
BD	0.000000 mg/liter	GC
CD	0.000000 mg/liter	GC
DD	0.000000 mg/liter	GC
ED	0.000000 mg/liter	GC
FD	0.000000 mg/liter	GC
GD	0.000000 mg/liter	GC
HD	0.000000 mg/liter	GC
ID	0.000000 mg/liter	GC
JD	0.000000 mg/liter	GC
KD	0.000000 mg/liter	GC
LD	0.000000 mg/liter	GC
MD	0.000000 mg/liter	GC
ND	0.000000 mg/liter	GC
OD	0.000000 mg/liter	GC
PD	0.000000 mg/liter	GC
QD	0.000000 mg/liter	GC
RD	0.000000 mg/liter	GC
SD	0.000000 mg/liter	GC
TD	0.000000 mg/liter	GC
UD	0.000000 mg/liter	GC
VD	0.000000 mg/liter	GC
WD	0.000000 mg/liter	GC
XD	0.000000 mg/liter	GC
YD	0.000000 mg/liter	GC
ZD	0.000000 mg/liter	GC
AE	0.000000 mg/liter	GC
BE	0.000000 mg/liter	GC
CE	0.000000 mg/liter	GC
DE	0.000000 mg/liter	GC
EE	0.000000 mg/liter	GC
FE	0.000000 mg/liter	GC
GE	0.000000 mg/liter	GC
HE	0.000000 mg/liter	GC
IE	0.000000 mg/liter	GC
JE	0.000000 mg/liter	GC
KE	0.000000 mg/liter	GC
LE	0.000000 mg/liter	GC
ME	0.000000 mg/liter	GC
NE	0.000000 mg/liter	GC
OE	0.000000 mg/liter	GC
PE	0.000000 mg/liter	GC
QE	0.000000 mg/liter	GC
RE	0.000000 mg/liter	GC
SE	0.000000 mg/liter	GC
TE	0.000000 mg/liter	GC
UE	0.000000 mg/liter	GC
VE	0.000000 mg/liter	GC
WE	0.000000 mg/liter	GC
XE	0.000000 mg/liter	GC
YE	0.000000 mg/liter	GC
ZE	0.000000 mg/liter	GC
AF	0.000000 mg/liter	GC
BF	0.000000 mg/liter	GC
CF	0.000000 mg/liter	GC
DF	0.000000 mg/liter	GC
EF	0.000000 mg/liter	GC
FF	0.000000 mg/liter	GC
GF	0.000000 mg/liter	GC
HF	0.000000 mg/liter	GC
IF	0.000000 mg/liter	GC
JF	0.000000 mg/liter	GC
KF	0.000000 mg/liter	GC
LF	0.000000 mg/liter	GC
MF	0.000000 mg/liter	GC
NF	0.000000 mg/liter	GC
OF	0.000000 mg/liter	GC
PF	0.000000 mg/liter	GC
QF	0.000000 mg/liter	GC
RF	0.000000 mg/liter	GC
SF	0.000000 mg/liter	GC
TF	0.000000 mg/liter	GC
UF	0.000000 mg/liter	GC
VF	0.000000 mg/liter	GC
WF	0.000000 mg/liter	GC
XF	0.000000 mg/liter	GC
YF	0.000000 mg/liter	GC
ZF	0.000000 mg/liter	GC
AG	0.000000 mg/liter	GC
BG	0.000000 mg/liter	GC
CG	0.000000 mg/liter	GC
DG	0.000000 mg/liter	GC
EG	0.000000 mg/liter	GC
FG	0.000000 mg/liter	GC
GG	0.000000 mg/liter	GC
HG	0.000000 mg/liter	GC
IG	0.000000 mg/liter	GC
JG	0.000000 mg/liter	GC
KG	0.000000 mg/liter	GC
LG	0.000000 mg/liter	GC
MG	0.000000 mg/liter	GC
NG	0.000000 mg/liter	GC
OG	0.000000 mg/liter	GC
PG	0.000000 mg/liter	GC
QG	0.000000 mg/liter	GC
RG	0.000000 mg/liter	GC
SG	0.000000 mg/liter	GC
TG	0.000000 mg/liter	GC
UG	0.000000 mg/liter	GC
VG	0.000000 mg/liter	GC
WG	0.000000 mg/liter	GC
XG	0.000000 mg/liter	GC
YG	0.000000 mg/liter	GC
ZG	0.000000 mg/liter	GC
AH	0.000000 mg/liter	GC
BH	0.000000 mg/liter	GC
CH	0.000000 mg/liter	GC
DH	0.000000 mg/liter	GC
EH	0.000000 mg/liter	GC
FH	0.000000 mg/liter	GC
GH	0.000000 mg/liter	GC
IH	0.000000 mg/liter	GC
JH	0.000000 mg/liter	GC
KH	0.000000 mg/liter	GC
LH	0.000000 mg/liter	GC
MH	0.000000 mg/liter	GC
NH	0.000000 mg/liter	GC
OH	0.000000 mg/liter	GC
PH	0.000000 mg/liter	GC
QH	0.000000 mg/liter	GC
RH	0.000000 mg/liter	GC
SH	0.000000 mg/liter	GC
TH	0.000000 mg/liter	GC
UH	0.000000 mg/liter	GC
VH	0.000000 mg/liter	GC
WH	0.000000 mg/liter	GC
XH	0.000000 mg/liter	GC
YH	0.000000 mg/liter	GC
ZH	0.000000 mg/liter	GC
AI	0.000000 mg/liter	GC
BI	0.000000 mg/liter	GC
CI	0.000000 mg/liter	GC
DI	0.000000 mg/liter	GC
EI	0.000000 mg/liter	GC
FI	0.000000 mg/liter	GC
GI	0.000000 mg/liter	GC
HI	0.000000 mg/liter	GC
JI	0.000000 mg/liter	GC
KI	0.000000 mg/liter	GC
LI	0.000000 mg/liter	GC
MI	0.000000 mg/liter	GC
NI	0.000000 mg/liter	GC
OI	0.000000 mg/liter	GC
PI	0.000000 mg/liter	GC
QI	0.000000 mg/liter	GC
RI	0.000000 mg/liter	GC
SI	0.000000 mg/liter	GC
TI	0.000000 mg/liter	GC
UI	0.000000 mg/liter	GC
VI	0.000000 mg/liter	GC
WI	0.000000 mg/liter	GC
XI	0.000000 mg/liter	GC
YI	0.000000 mg/liter	GC
ZI	0.000000 mg/liter	GC
AJ	0.000000 mg/liter	GC
BJ	0.000000 mg/liter	GC
CJ	0.000000 mg/liter	GC
DJ	0.000000 mg/liter	GC
EJ	0.000000 mg/liter	GC
FJ	0.000000 mg/liter	GC
GJ	0.000000 mg/liter	GC
HJ	0.000000 mg/liter	GC
IJ	0.000000 mg/liter	GC
JJ	0.000000 mg/liter	GC
KJ	0.000000 mg/liter	GC
LJ	0.000000 mg/liter	GC
MJ	0.000000 mg/liter	GC
NJ	0.000000 mg/liter	GC
OJ	0.000000 mg/liter	GC
PJ	0.000000 mg/liter	GC
QJ	0.000000 mg/liter	GC
RJ	0.000000 mg/liter	GC
SJ	0.000000 mg/liter	GC
TJ	0.000000 mg/liter	GC
UJ	0.000000 mg/liter	GC
VJ	0.000000 mg/liter	GC
WJ	0.000000 mg/liter	GC
XJ	0.000000 mg/liter	GC
YJ	0.000000 mg/liter	GC
ZJ	0.000000 mg/liter	GC
AK	0.000000 mg/liter	GC
BK	0.000000 mg/liter	GC
CK	0.000000 mg/liter	GC
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EK	0.000000 mg/liter	GC
FK	0.000000 mg/liter	GC
GK	0.000000 mg/liter	GC
HK	0.000000 mg/liter	GC
JK	0.000000 mg/liter	GC
KK	0.000000 mg/liter	GC
LK	0.000000 mg/liter	GC
MK	0.000000 mg/liter	GC
NK	0.000000 mg/liter	GC
OK	0.000000 mg/liter	GC
PK	0.000000 mg/liter	GC
QK	0.000000 mg/liter	GC
RK	0.000000 mg/liter	GC
SK	0.000000 mg/liter	GC
TK	0.000000 mg/liter	GC
UK	0.000000 mg/liter	GC
VK	0.000000 mg/liter	GC
WK	0.000000 mg/liter	GC
XK	0.000000 mg/liter	GC
YK	0.000000 mg/liter	GC
ZK	0.000000 mg/liter	GC
AL	0.000000 mg/liter	GC
BL	0.000000 mg/liter	GC
CL	0.000000 mg/liter	GC
DL	0.000000 mg/liter	GC
EL	0.000000 mg/liter	GC
FL	0.000000 mg/liter	GC
GL	0.000000 mg/liter	GC
HL	0.000000 mg/liter	GC
IL	0.000000 mg/liter	GC
JL	0.000000 mg/liter	GC
KL	0.000000 mg/liter	GC
LL	0.000000 mg/liter	GC
ML	0.000000 mg/liter	GC
NL	0.000000 mg/liter	GC
OL	0.000000 mg/liter	GC
PL	0.000000 mg/liter	GC
QL	0.000000 mg/liter	GC
RL	0.000000 mg/liter	GC
SL	0.000000 mg/liter	GC
TL	0.000000 mg/liter	GC
UL	0.000000 mg/liter	GC
VL	0.000000 mg/liter	GC
WL	0.000000 mg/liter	GC
XL	0.000000 mg/liter	GC
YL	0.000000 mg/liter	GC
ZL	0.000000 mg/liter	GC
AM	0.000000 mg/liter	GC
BM	0.000000 mg/liter	GC
CM	0.000000 mg/liter	GC
DM	0.000000 mg/liter	GC
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KM	0.000000 mg/liter	GC
LM	0.000000 mg/liter	GC
MM	0.000000 mg/liter	GC
NM	0.000000 mg/liter	GC
OM	0.000000 mg/liter	GC
PM	0.000000 mg/liter	GC
QM	0.000000 mg/liter	GC
RM	0.000000 mg/liter	GC
SM	0.000000 mg/liter	GC
TM	0.000000 mg/liter	GC
UM	0.000000 mg/liter	GC
VM	0.000000 mg/liter	GC
WM	0.000000 mg/liter	GC
XM	0.000000 mg/liter	GC
YM	0.000000 mg/liter	GC
ZM	0.000000 mg/liter	GC
AN	0.000000 mg/liter	GC
BN	0.000000 mg/liter	GC
CN	0.000000 mg/liter	GC
DN	0.000000 mg/liter	GC
EN	0.000000 mg/liter	GC
FN	0.000000 mg/liter	GC
GN	0.000000 mg/liter	GC
HN	0.000000 mg/liter	GC
IN	0.000000 mg/liter	GC
JN	0.000000 mg/liter	GC
KN	0.000000 mg/liter	GC
LN	0.000000 mg/liter	GC
MN	0.000000 mg/liter	GC
NN	0.000000 mg/liter	GC
ON	0.000000 mg/liter	GC
PN	0.000000 mg/liter	GC
QN	0.000000 mg/liter	GC
RN	0.000000 mg/liter	GC
SN	0.000000 mg/liter	GC
TN	0.000000 mg/liter	GC
UN	0.000000 mg/liter	GC
VN	0.000000 mg/liter	GC
WN	0.000000 mg/liter	GC
XN	0.000000 mg/liter	GC
YN	0.000000 mg/liter	GC
ZN	0.000000 mg/liter	GC
AO	0.000000 mg/liter	GC
BO	0.000000 mg/liter	GC
CO	0.000000 mg/liter	GC
DO	0.000000 mg/liter	GC
EO	0.000000 mg/liter	GC
FO	0.000000 mg/liter	GC
GO	0.000000 mg/liter	GC
HO	0.000000 mg/liter	GC
IO	0.000000 mg/liter	GC
JO	0.000000 mg/liter	GC
KO	0.000000 mg/liter	GC
LO	0.000000 mg/liter	GC
MO	0.000000 mg/liter	GC
NO	0.000000 mg/liter	GC
OO	0.000000 mg/liter	GC
PO	0.000000 mg/liter	GC
QO	0.000000 mg/liter	GC
RO	0.000000 mg/liter	GC
SO	0.000000 mg/liter	GC
TO	0.000000 mg/liter	GC
UO	0.000000 mg/liter	GC
VO	0.000000 mg/liter	GC
WO	0.000000 mg/liter	GC
XO	0.000000 mg/liter	GC
YO	0.000000 mg/liter	GC
ZO	0.000000 mg/liter	GC
AP	0.000000 mg/liter	GC
BP	0.000000 mg/liter	GC
CP	0.000000 mg/liter	GC
DP	0.000000 mg/liter	GC
EP	0.000000 mg/liter	GC
FP	0.000000 mg/liter	GC
GP	0.000000 mg/liter	GC
HP	0.000000 mg/liter	GC
IP	0.000000 mg/liter	GC
JP	0.000000 mg/liter	GC
KP	0.000000 mg/liter	GC
LP	0.000000 mg/liter	GC
MP	0.000000 mg/liter	GC
NP	0.000000 mg/liter	GC
OP	0.000000 mg/liter	GC
PP	0.000000 mg/liter	GC
QP	0.000000 mg/liter	GC
RP	0.000000 mg/liter	GC
SP	0.000000 mg/liter	GC
TP	0.000000 mg/liter	GC
UP	0.000000 mg/liter	GC
VP	0.000000 mg/liter	GC
WP	0.000000 mg/liter	GC
XP	0.000000 mg/liter	GC
YP	0.000000 mg/liter	GC
ZP	0.000000 mg/liter	GC
AQ	0.000000 mg/liter	GC
BQ	0.000000 mg/liter	GC
CQ	0.000000 mg/liter	GC
DQ	0.000000 mg/liter	GC
EQ	0.000000 mg/liter	GC
FQ	0.000000 mg/liter	GC
GQ	0.000000 mg/liter	GC
HQ	0.000000 mg/liter	GC
IQ	0.000000 mg/liter	GC
JQ	0.000000 mg/liter	GC
KQ	0.000000 mg/liter	GC
LQ	0.000000 mg/liter	GC
MQ	0.000000 mg/liter	GC
NQ	0.000000 mg/liter	GC
OQ	0.000000 mg/liter	GC
PQ	0.000000 mg/liter	GC
QQ	0.000000 mg/liter	GC
RQ	0.000000 mg/liter	GC
SQ	0.000000 mg/liter	GC
TQ	0.000000 mg/liter	GC
UQ	0.000000 mg/liter	GC
VQ	0.000000 mg/liter	GC
WQ	0.000000 mg/liter	GC
XQ	0.000000 mg/liter	GC
YQ	0.000000 mg/liter	GC
ZQ	0.	

[illegible]

	Weight	Micrograms per liter
1	0.5	Remedial Goal
2	1	Concentration Exceeds RfC
3	2	Normal/Primary Sample
4	3	Field Duplicate
5	4	Not detected
6	5	Estimated value
7	6	The value was obtained during analysis
8	7	Analyte was present presumptively
9	8	Not analyzed
10	9	Highest concentration seen

Appendix E
Historical Groundwater Results from 2003 to 2014Q1
Pesticides and Metals for MW-15

Sample Location: Sample Date: Sample Type:	MW-15 08/17/2003	MW-15 09/10/2004	MW-15 11/16/2006	MW-15 12/13/2006	MW-15 12/04/2007	MW-15 12/03/2008	MW-15 12/09/2009	MW-15 03/17/2010	MW-15 11/30/2010	MW-15 12/01/2011	MW-15 12/11/2012	MW-15 06/18/2013	MW-15 09/04/2013	MW-15 12/11/2013	MW-15 03/25/2014
RG	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Units															
Analyte															
Pesticides															
4,4'-DDD	0.1	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
4,4'-DDE	0.1	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
4,4'-DDE	0.1	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Alachlor	0.002	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
alpha-Chloro	0.006	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
alpha-Chloro	2	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
beta-BHC	0.02	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
delta-BHC	0.006	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Endrin	0.002	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Endosulfan I	0.002	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Endosulfan II	0.002	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Endosulfan sulfone	2	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Endrin aldehyde	0.002	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Endrin ketone	0.002	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
gamma-BHC (Lindane)	0.2	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Heptachlor	0.4	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Heptachlor epoxide	0.4	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Melconylchlor	3	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Touphane	3	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Total Pesticides		µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Metals															
Chromium	100	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
Lead	15	µg/L	0.0016 J	0.0210	0.0210	0.0210	148	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210

Notes:
µg/L = Micrograms per liter
RG = Remedial Goal
N = Concentration Exceeds RG
PD = Not a Duplicate Sample
U = Field Duplicate
J = Not detected
D = Estimated value
NJ = The value was obtained during a secondary dilution.
NA = Analyte was presumptively present and tentatively identified at the approximate concentration listed.
Not analyzed
Highest concentration exceeding RG during period (month/year)

Appendix E
Historical Groundwater Results from 2003 to 2014Q1
Pesticides and Metals for MW-16

Sample Location	Sample Date	Sample Type	MW-15		MW-16		MW-16		MW-16		MW-16		MW-16		MW-16		MW-16		MW-16		MW-16		MW-16			
			N	U	N	U	N	U	N	U	N	U	N	U	N	U	N	U	N	U	N	U	N	U		
Analyte	Units	RG																								
Pesticides																										
4,4'-DDD	µg/L	0.1	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
4,4'-DDE	µg/L	0.1	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
4,4'-DDT	µg/L	0.1	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Alar	µg/L	0.002	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
alpha-BHC	µg/L	0.006	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
alpha-Chloro-dione	µg/L	2	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
beta-BHC	µg/L	0.02	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
delta-BHC	µg/L	0.006	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Dieldrin	µg/L	0.002	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Endosulfan I	µg/L		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Endosulfan II	µg/L		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Endosulfan sulfate	µg/L	2	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Endrin	µg/L		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Endrin aldehyde	µg/L		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Endrin ketone	µg/L	0.2	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
gamma-BHC (lindane)	µg/L	2	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
gamma-Chloro-dione	µg/L	0.4	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Heptachlor	µg/L		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Heptachlor epoxide	µg/L	0.4	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Mephosfolor	µg/L	3	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Toxaphene	µg/L		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Total Pesticides	µg/L		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Metals																										
Chromium	µg/L	100	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			
Lead	µg/L	15	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000			

Notes:
µg/L Micrograms per liter
RG Remedial Goal
a Concentration Exceeds RG
N Normal/Primary Sample
FD Field Duplicate
U Not detected
E Estimated value
D The value was obtained during a secondary dilution
NI analysis was presumptively present and tentatively identified at the approximate concentration listed
NA Not analyzed
H Highest concentration exceeding RG during posted timeframe

Appendix E
Historical Groundwater Results from 2003 to 2014Q1
Pesticides and Metals for MW-17

Sample Location: Sample Date: Sample Type:	MW-17 08/21/2003	MW-17 09/07/2004	MW-17 11/17/2005	MW-17 12/12/2006	MW-17 12/06/2007	MW-17 12/04/2008	MW-17 12/10/2009	MW-17 03/18/2010	MW-17 11/30/2010	MW-17 12/02/2011	MW-17 12/11/2012	MW-17 06/19/2013	MW-17 05/05/2013	MW-17 12/12/2013	MW-17 03/25/2014
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Units														
Pesticides															
4,4'-DDD	0.1	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
4,4'-DDE	0.1	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
4,4'-DDT	0.1	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Adrin	0.002	µg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
alpha-BHC	0.006	µg/L	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
alpha-Chlordane	2	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
beta-BHC	0.02	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
delta-BHC	0.006	µg/L	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Dieldrin	0.002	µg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Endosulfan I	0.002	µg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Endosulfan II	0.002	µg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Endosulfan sulfate	0.002	µg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Endrin	2	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Endrin aldehyde	0.002	µg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Endrin ketone	0.002	µg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
gamma-BHC (lindane)	0.2	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
gamma-Chlordane	2	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Heptachlor	0.4	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Heptachlor epoxide	0.4	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Methoxyflor	0.4	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Toxaphene	3	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Total Pesticides	3	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Metals															
Chromium	330	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Copper	15	µg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Notes:
µg/L
AC
Remedial Goal
Concentration Exceeds PG
Normal/Primary Sample
Field Duplicate
Not detected
Estimated value
The value was obtained during a secondary dilution.
Analyte was presumptively present and tentatively identified at the appropriate concentration listed
Not analyzed
Highest concentration exceeding PG during posted timeframe

Appendix E
Historical Groundwater Results from 2003 to 2014Q1
Pesticides and Metals for MW-18

Sample Location: Sample Date: Sample Type:	RG	Units	Analyze	Pesticides												Metals																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
				MW-18 08/21/2003	MW-18 09/09/2004	MW-18 11/17/2005	MW-18 12/12/2006	MW-18 12/06/2007	MW-18 12/04/2008	MW-18 12/10/2009	MW-18 03/18/2010	MW-18 12/01/2010	MW-18 12/02/2011	MW-18 12/12/2012	MW-18 06/19/2013	MW-18 06/05/2013	MW-18 12/12/2013	MW-18 03/25/2014																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
4,4'-DDD	0.1	µg/L				0.046 J																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Notes:
µg/L = Micrograms per liter
RG = Remedial Goal
a = Concentration Exceeds RG
N = Normal Primary Sample
FD = Field Duplicate
U = Not detected
E = Estimated value
D = The value was obtained during a secondary dilution.
ND = Analyte was previously present and tentatively identified at the approximate concentration listed
NA = Not analyzed
Highest concentration occurring at during posted timeframe

Address:	
10/01	Micrograms per liter
BC	Remedial Goal
a	Concentration Exceeds RIG
N	Normal/Primary Sample
FEQ	Field Duplicate
U	Not detected
J	Estimated value
D	The value was obtained during a secondary dilution
N.I.	Analysis was presumptively present and tentatively classified at the approval concentration listed.
NA	Not analyzed
	Highpass concentration exceeded RIG during review's week-end

Appendix F

Concentration	Micrograms per liter
Remedial Goal	10
Concentration Exceeds RfC	10
Normal/Primary Sample	10
Field Duplicate	10
Not detected	10
Estimated value	10
The value was obtained during the sampling process	10
Analysis was presumptive only	10
Not analyzed	10
Highest concentration at location	10

[illegible]

Analysis	Method	Result	Unit	Notes
Micrograms per liter				
Bermudez Goal				
Concentration Exceeds PG				
Normal Primary Sample				
Field Duplicate				
Not detected				
Estimated value				
The value was obtained during a secondary dilution				
Analyte was presumptively present and tentatively identified at the approval concentration listed				
Not analyzed				
High level concentration detected (PG = 4.0 mg/L)				

Appendix E
Historical Groundwater Results from 2003 to 2014Q1
Pesticides and Metals for MW-26

[illegible]

Notes:	
1.0/L	* Milligrams per liter
SG	* Remedial Goal
2	* Concentration Exceeds RG
N	* Normal/Primary Sample
FD	* Field Duplicate
U	* Not detected
3	* Estimated value
D	* The value was obtained due to analytical error
N1	* Analyte was presumptively not analyzed
NA	

Appendix E
Historical Groundwater Results from 2012 to 2014Q1
VOCS, Pesticides, and Metals for MW-27

Sample Location: MW-27 MW-27 MW-27 MW-27 MW-27
Sample Date: 12/12/2012 06/18/2013 09/04/2013 12/11/2013 03/24/2014
Sample Type: N N N N N

Analyte	RG	Units	N	N	N	N	N
VOCS							
Benzene	5	µg/L	1 U	NA	NA	NA	NA
Toluene		µg/L	1 U	NA	NA	NA	NA
Ethylbenzene		µg/L	1 U	NA	NA	NA	NA
Xylene (Total)		µg/L	1 U	NA	NA	NA	NA
Pesticides							
4,4'-DDD	0.1	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
4,4'-DDE	0.1	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
4,4'-DDT	0.1	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Aldrin	0.002	µg/L	0.0021 U	0.002 U	0.002 U	0.002 U	0.002 U
alpha-BHC	0.006	µg/L	0.0062 U	0.006 U	0.006 U	0.006 U	0.006 U
alpha-Chlordane	2	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
beta-BHC	0.02	µg/L	0.0049 U	0.02 U	0.02 U	0.02 U	0.02 U
delta-BHC	0.006	µg/L	0.0062 U	0.006 U	0.006 U	0.006 U	0.006 U
Dieldrin	0.002	µg/L	0.0021 U	0.002 U	0.002 U	0.002 U	0.002 U
Endosulfan I		µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Endosulfan II		µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Endosulfan sulfate		µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Endrin	2	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Endrin aldehyde		µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Endrin ketone		µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
gamma-BHC (Lindane)	0.2	µg/L	0.021 U	0.02 U	0.02 U	0.02 U	0.02 U
gamma-Chlordane	2	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Heptachlor	0.4	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Heptachlor epoxide		µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Methoxychlor		µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Toxaphene	3	µg/L	0.26 U	0.25 U	0.25 U	0.25 U	0.25 U
Total Pesticides		µg/L	0.0049	U	U	U	U
Metals							
Chromium	100	µg/L	5 U	NA	NA	5 U	NA
Lead	15	µg/L	3.8 J	NA	NA	10 U	NA

Notes:
µg/L = Micrograms per liter

Appendix E
Historical Groundwater Results from 2012 to 2014Q1
VOCs, Pesticides, and Metals for MW-28

Sample Location: MW-28 MW-28 MW-28 MW-28 MW-28
Sample Date: 12/12/2012 06/18/2013 09/04/2013 12/11/2013 03/24/2014
Sample Type: N N N N N

Analyte	RG	Units	N	N	N	N	N
VOCs							
Benzene	5	µg/L	1 U	NA	NA	NA	NA
Toluene		µg/L	1 U	NA	NA	NA	NA
Ethylbenzene		µg/L	1 U	NA	NA	NA	NA
Xylene (Total)		µg/L	1 U	NA	NA	NA	NA
Pesticides							
4,4'-DDD	0.1	µg/L	0.026 UJ	0.0016 J	0.025 U	0.025 U	0.025 U
4,4'-DDE	0.1	µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 U
4,4'-DDT	0.1	µg/L	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Aldrin	0.002	µg/L	0.002 U	0.002 U	0.002 J	0.002 U	0.002 U
alpha-BHC	0.006	µg/L	0.0061 U	0.0036 J	0.006 U	0.006 U	0.006 U
alpha-Chlordane	2	µg/L	0.026 UJ	0.15 a	0.025 U	0.025 U	0.025 U
beta-BHC	0.02	µg/L	0.02 U	0.23 a	0.096 a	0.17 a	0.006 U
delta-BHC	0.006	µg/L	0.0061 U	0.006 U	0.006 U	0.006 U	0.006 U
Dieldrin	0.002	µg/L	0.002 UJ	0.0026 a	0.002 U	0.002 U	0.002 U
Endosulfan I		µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 U
Endosulfan II		µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 U
Endosulfan sulfate		µg/L	0.026 U	0.0011 J	0.025 U	0.025 U	0.025 U
Endrin	2	µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 UJ
Endrin aldehyde		µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 UJ
Endrin ketone		µg/L	0.026 U	0.0041 J	0.0087 J	0.0033 J	0.0056 J
gamma-BHC (Lindane)	0.2	µg/L	0.02 U	0.02 U	0.0057 J	0.02 U	0.0034 J
gamma-Chlordane	2	µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 U
Heptachlor	0.4	µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 U
Heptachlor epoxide		µg/L	0.026 UJ	0.025 U	0.025 U	0.025 U	0.025 U
Methoxychlor		µg/L	0.002 J	0.1 U	0.1 U	0.1 UJ	0.0021 J
Toxaphene	3	µg/L	0.26 UJ	0.25 U	0.25 U	0.25 UJ	0.25 U
Total Pesticides		µg/L	0.002	0.1604	0.257	0.1013	0.1811
Metals							
Chromium	100	µg/L	5 U	NA	NA	2.2 J	NA
Lead	15	µg/L	4.3 J	NA	NA	10 U	NA

Notes:
µg/L = Micrograms per liter
RG = Remedial Goal
a = Concentration Exceeds RG

Appendix E
Historical Groundwater Results from 2012 to 2014Q1
VOCS, Pesticides, and Metals for MW-29

Sample Location: MW-29 MW-29 MW-29 MW-29
Sample Date: 12/11/2012 06/18/2013 09/03/2013 12/11/2013 03/24/2014
Sample Type: N N N N N

Analyte	RG	Units	N	N	N	N	N
VOCS							
Benzene	5	µg/L	1 U	NA	NA	NA	NA
Toluene		µg/L	1 U	NA	NA	NA	NA
Ethylbenzene		µg/L	1 U	NA	NA	NA	NA
Xylene (Total)		µg/L	1 U	NA	NA	NA	NA
Pesticides							
4,4'-DDD	0.1	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
4,4'-DDE	0.1	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
4,4'-DDT	0.1	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Aldrin	0.002	µg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
alpha-BHC	0.006	µg/L	0.0061 U	0.006 U	0.006 U	0.006 U	0.006 U
alpha-Chlordane	2	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
beta-BHC	0.02	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
delta-BHC	0.006	µg/L	0.0061 U	0.006 U	0.006 U	0.006 U	0.006 U
Dieldrin	0.002	µg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Endosulfan I		µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Endosulfan II		µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Endosulfan sulfate		µg/L	0.025 U	0.0011 J	0.025 U	0.025 U	0.025 U
Endrin	2	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Endrin aldehyde		µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Endrin ketone		µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
gamma-BHC (Lindane)	0.2	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
gamma-Chlordane	2	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Heptachlor	0.4	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Heptachlor epoxide		µg/L	0.025 U	0.025 U	0.0032 J	0.025 U	0.025 U
Methoxychlor		µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Toxaphene	3	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total Pesticides		µg/L	U	0.0056	0.0032	U	U
Metals							
Chromium	100	µg/L	8.6	NA	NA	8.8	NA
Lead	15	µg/L	2.6 J	NA	NA	10 U	NA

Notes:
µg/L = Micrograms per liter
RG = Remedial Goal
J = Provisional Remedial Goal

Appendix E

Historical Groundwater Results from 2012 to 2014Q1

VOCs, Pesticides, and Metals for MW-33

Notes	
Log1	Micrograms per liter
PG	Remedial Goal
a	Concentration Exceeds RG
N	Normal Primary Sample
FD	Field Duplicate
U	Not detected
J	Estimated value
D	The value was obtained during a secondary dilution.
NJ	Analyte was presumptively present and tentatively identified at the approximate concentration listed.
NA	Not analyzed
	Highest concentration exceeding RG during posted timeframe

Appendix E

Historical Groundwater Results from 2012 to 2014Q1

VOCs, Pesticides, and Metals for MW-34

Sample Location: MW-34 MW-34 MW-34 MW-34 MW-34
Sample Date: 12/10/2012 06/18/2013 09/04/2013 12/11/2013 03/26/2014
Sample Type: N N N N N

Analyte	RG	Units	N	N	N	N	N
VOCs							
Benzene	5	µg/L	1 U	NA	NA	NA	NA
Toluene		µg/L	1 U	NA	NA	NA	NA
Ethylbenzene		µg/L	1 U	NA	NA	NA	NA
Xylene (Total)		µg/L	1 U	NA	NA	NA	NA
Pesticides							
4,4'-DDD	0.1	µg/L	0.0072 J	0.025 U	0.025 U	0.025 U	0.25 U
4,4'-DDE	0.1	µg/L	0.025 UR	0.025 U	0.025 U	0.025 U	0.25 U
4,4'-DDT	0.1	µg/L	0.015 J	0.025 U	0.025 U	0.025 U	0.022 J
Aldrin	0.002	µg/L	0.002 UR	0.002 U	0.002 U	0.002 U	0.02 U
alpha-BHC	0.006	µg/L	0.0061 UR	0.006 U	0.0011 J	0.006 U	0.06 U
alpha-Chlordane	2	µg/L	0.025 UR	0.025 U	0.025 U	0.025 U	0.25 U
beta-BHC	0.02	µg/L	0.02 UR	0.02 U	0.02 U	0.02 U	0.2 U
delta-BHC	0.006	µg/L	0.0061 UR	0.006 U	0.006 U	0.006 U	0.06 U
Dieldrin	0.002	µg/L	0.002 UR	0.002 U	0.002 U	0.002 U	0.02 U
Endosulfan I		µg/L	0.025 UR	0.025 U	0.025 U	0.025 U	0.25 U
Endosulfan II		µg/L	0.025 UR	0.025 U	0.025 U	0.025 U	0.25 U
Endosulfan sulfate		µg/L	0.025 UR	0.0054 J	0.025 U	0.025 U	0.25 U
Endrin	2	µg/L	0.025 UR	0.025 U	0.025 U	0.025 U	0.25 U
Endrin aldehyde		µg/L	0.01 J	0.047	0.025 U	0.025 U	0.25 U
Endrin ketone		µg/L	0.025 UR	0.025 U	0.025 U	0.0024 J	0.25 U
gamma-BHC (Lindane)	0.2	µg/L	0.02 UR	0.02 U	0.02 U	0.02 U	0.2 U
gamma-Chlordane	2	µg/L	0.025 UJ	0.025 U	0.025 U	0.025 U	0.25 U
Heptachlor	0.4	µg/L	0.025 UR	0.025 U	0.025 U	0.025 U	0.25 U
Heptachlor epoxide		µg/L	0.025 UR	0.025 U	0.0032 J	0.025 U	0.25 U
Methoxychlor		µg/L	0.1 UR	0.0055 J	0.1 U	0.1 UJ	1 U
Toxaphene	3	µg/L	0.25 UR	0.78 J	0.25 U	0.25 U	2.5 U
Total Pesticides		µg/L	0.0322	0.0589	0.7843	0.0024	0.022
Metals							
Chromium	100	µg/L	5 U	NA	NA	11	NA
Lead	15	µg/L	3.1 J	NA	NA	10 U	NA

Notes:

Appendix F: Photographs from Site Inspection Visit

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 1 – South towards office and inspection team



Photo 2 – Warehouse



Photo 3 – Fence on east side of property



Photo 4 – Eastern side of the warehouse



Photo 5 – Fire hydrant on east side of property



Photo 6 – MW14

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 7 – monitoring wells 19 and 20



Photo 8 – Tree on fence; northeast corner of grid C



Photo 9 – MWs 5 and 8



Photo 10 – Warehouse (facing south)



Photo 11 – MW4

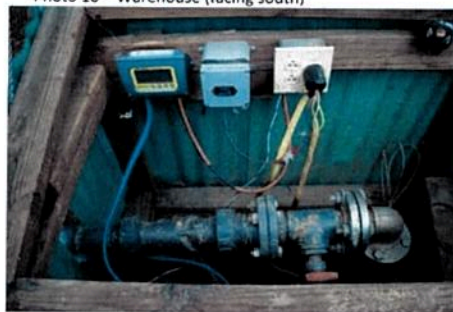


Photo 12 – Pump and treat system shed

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 13 – recovery well cluster and MW4



Photo 14 – MW south of recovery well and MW4



Photo 15 – Out of service monitoring well



Photo 16 – Western loading dock of warehouse



Photo 17 – Facing north towards recovery well



Photo 18 – Sampling at MW 15 and 16

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 19 – Limbs on fence (western edge of property)



Photo 20 – Facing east



Photo 21 – Fence along western edge of property



Photo 22 – Hole under fence on southern side of property



Photo 23 – Facing south toward MW cluster at old lumber mill



Photo 24 – MWs 1 and 2

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 25 – Facing north



Photo 26 – Trash dumped outside fence south of site



Photo 27 – Trash dumped outside fence south of site



Photo 28 – Trash dumped outside fence south of site



Photo 29 – MWs 33 and 34



Photo 30 – Former lumber mill

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 31 – Former lumber mill



Photo 32 – MWs 31 and 32 being sampled in distance



Photo 33 – MW 10



Photo 34 – Helena Chemical Company sign

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014

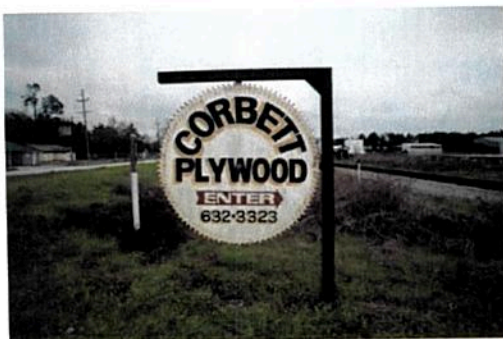


Photo 35 – Corbett Plywood sign



Photo 36 – MW 22



Photo 37 – MW 21



Photo 38 – MW 21 and 22 facing north



Photo 39 – MW 28



Photo 40 – MW 27

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 41 – MWs 27 and 28 facing south



Photo 42 – MW 29

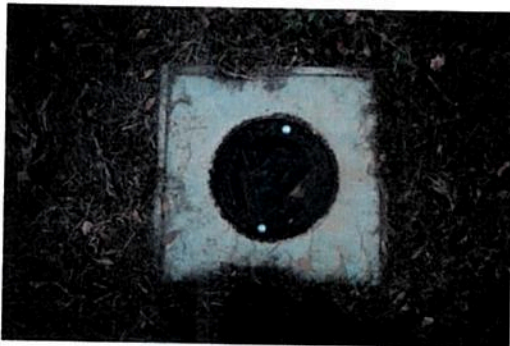


Photo 43 – MW 30



Photo 44 – MWs 29 and 30 facing west

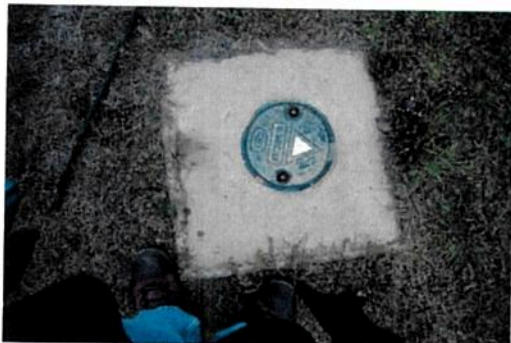


Photo 45 – MW 32



Photo 46 – MW 31

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 47 – MWs 31 and 32 facing north

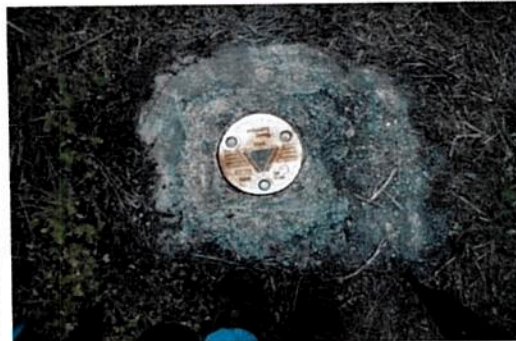


Photo 48 – MW 26

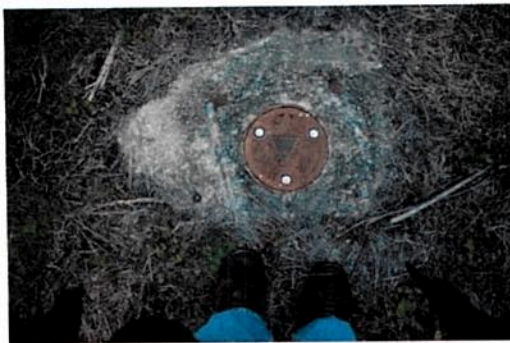


Photo 49 – MW 25

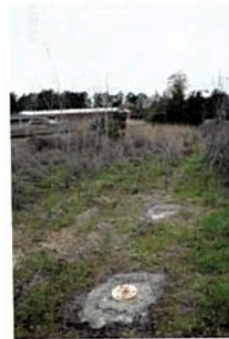


Photo 50 – MWs 25 and 26 facing south



Photo 51 – MW 3 and 6



Photo 52 – MWs 17 and 18

Photo Log for Site Inspection – Helena Chemical - Fairfax

March 25, 2014



Photo 53 – Public water well near MW 17



Photo 54 – Public water well tag (off of Aiken Ave)



Photo 55 – Public well off of Aiken Ave

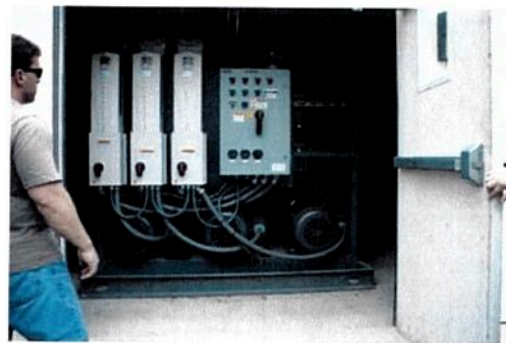


Photo 56 – New pumps/backup generators off of Aiken Ave

